Health Protection Surveillance Centre

Annual Report 2006

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

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Table of Contents

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Introduction

This is our eighth annual report. It highlights many of the successes in the battle against infectious disease, as well as drawing attention to a number of areas of concern.

Figures for *Haemophilus influenzae* B (Hib) disease highlight the success of the booster Hib vaccine. Just one case of the disease was reported in 2006 in 1-4 year olds – who were targeted for the vaccination catch-up programme – compared to 12 cases in 2005.

Measles and rubella infections are at their lowest rate ever, reflecting an increase in the uptake of the MMR vaccine. However, many European and other developed countries have eliminated these diseases altogether. The WHO has set a target of 2010 for the eradication of measles and rubella in Europe, so a catch-up vaccination programme has been recommended for primary and secondary schools so that this target can be met.

Trends for invasive meningococcal disease are largely unchanged over the last three years. However, when compared with reported cases in 1999 and 2000, the rate has declined substantially due to the success of the MenC vaccine programme. Unfortunately there is no vaccine for serogroup B which now accounts for 80% of meningococcal notifications.

MenC vaccine failures are rare. However, one case was reported in 2006. This failure, along with the recent experience with Hib disease in 2005, has led to a recommendation by the National Immunisation Advisory Committee for another dose of all conjugate vaccines after the age of 12 months.

A national mumps outbreak that began in November 2004 and continued throughout 2005 waned in the latter half of 2006. The majority of cases in 2006 were aged between 10 and 34 years. Unfortunately we only know the vaccination status for 209 of the 426 cases notified, which once again highlights the need for a national immunisation registry to improve the quality of information in our vaccination programme.

The number of invasive pneumococcal disease cases represents a considerable disease burden at around 400 cases a year. The decision by the National Immunisation Advisory Committee to recommend routine infant pneumococcal vaccination is therefore very welcome.

The latest validated information for tuberculosis is for 2005, when 450 cases were notified. While the total numbers have increased slightly over the last few years, the rates per 100,000 population have not changed significantly, due to inward migration increasing the overall population. However many of those arriving in Ireland come from high incidence countries so it is essential that we strengthen our public health TB control services.

The upward trend of gastrointestinal diseases, campylobacteriosis and verotoxin-producing *E. coli* (VTEC) - both *E. coli* O157 and non-O157 cases - continues. The latter almost certainly reflects improved diagnosis nationally of non-O157 infections, which is an important development as three cases of haemolytic uraemic syndrome (HUS) occurred in association with non-O157 VTEC. Drinking water from untreated private water supplies remains an important risk factor for VTEC infection in Ireland.

New laboratory methods have also improved surveillance of *Salmonella* at the National Salmonella Reference Laboratory in Galway. A new molecular method known as MLVA helps identify *S.* Typhimurium DT104 and improves detection of outbreaks.

Leptospirosis cases have increased in Ireland in recent years. Nine cases of this serious disease occurred in 2006 in people who had been in contact with river water. It is important that everyone taking part in river-based activities are aware of the potential hazards of this disease and how best to avoid them. We are also

seeing more malaria cases and again it is important for holiday makers and recent immigrants to take the appropriate precautions. Fact sheets and other information on these diseases are available on our website, www.hpsc.ie.

Hepatitis B cases remain high and a recent recommendation to add hepatitis B vaccination to the routine childhood schedule is very welcome. However it is important that those who frequently change sexual partners present for vaccination now, as they may be at risk through sexual contact. Hepatitis C remains a major cause of disease in Ireland with 1226 cases notified in 2006. The HSE is currently developing a national action plan which will focus efforts to combat this serious infection.

In all, 337 cases of HIV were reported in 2006. Twenty eight of these cases were diagnosed with AIDS at the same time, which is of concern and highlights the importance of HIV testing services. Early diagnosis of HIV facilitates early intervention and treatment and can prevent the onset of AIDS.

Gonorrhoea and chlamydia cases continue to increase, highlighting the continued need to promote the safe sex message and early testing.

In 2006, we also saw an increase in cases of viral meningitis. New diagnostic methods in the National Virus Reference Laboratory may have contributed to the increase in detection.

Overall outpatient antibiotic consumption has been rising steadily by 2.4% per year since 1993. This rise continued in 2006, with particular increases seen in the use of broad spectrum antibiotics. The rising level of antibiotic use, marked seasonal variation in use, and over-reliance on broad spectrum antibiotics, are all factors that promote increased rates of antimicrobial resistance. Overall antibiotic consumption in hospitals was found to be in the mid range, compared to other European countries.

Antimicrobial resistance continues to be a major public health challenge in Ireland. The proportion of meticillin resistant *Staphylococcus aureus* (MRSA) has stabilised, albeit at a high level. However, significant increases in resistance to a variety of antibiotics were seen in other key bacterial pathogens, including penicillin and erythromycin resistance in *Streptococcus pneumoniae*, vancomycin resistance in enterococci (VRE) and resistance to multiple antibiotics in *E. coli*. 2006 also saw the first reports of vancomycin-intermediate *S. aureus* (VISA) in Ireland, a potentially more resistant form of MRSA. These findings, coupled with rising rates of antibiotic consumption, continue to highlight the urgent need for full implementation of the recommendations included in the 2001 Strategy for the control of Antimicrobial Resistance in Ireland (SARI). It is therefore encouraging to see that healthcare-associated infection and antimicrobial resistance have been identified as priority issues for the HSE.

Once again, I'd like to thank the Scientific Advisory Committee and the HPSC sub-committees who have worked hard throughout the year. Thanks also to all of the staff at HPSC whose commitment and professionalism is reflected in this report.

Dr Darina O'Flanagan
Director
Health Protection Surveillance Centre

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Specialist in Public Health Medicine

01

Vaccine Preventable Diseases

1.1 *Haemophilus influenzae* (invasive)

Summary

Number of cases, 2006: 38
Number of cases, 2005: 34
Crude incidence rate, 2006: 0.9/100,000

In 2006, 38 cases of invasive *Haemophilus influenzae* disease were notified in Ireland (0.9/100,000 total population). This was similar to previous years when 34 and 38 cases were notified in 2005 and 2004, respectively (figure 1).

The main changes in 2006, when compared with the preceding two years were the decline by a quarter of the number of *H. influenzae* type b (Hib) cases and a doubling in the number of invasive *H.influenzae* cases due to non-capsular strains (figure 1). No noteworthy change in the number of cases due to other serotypes has been observed over recent years.

Non-capsular strains accounted for the majority of the invasive *H. influenzae* cases notified in 2006 (53%, n=20/38). The remaining cases were due to Hib (n=14, 37%), type e (n=2) and two isolates were not typed.

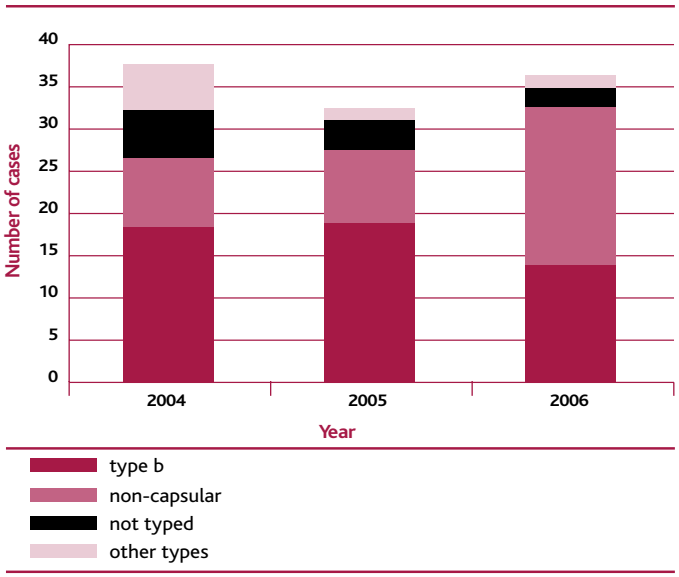

Figure 1. Annual number of invasive Haemophilus influenzae cases notified in Ireland, 2004-2006

The cases ranged in age from two weeks to 83 years. The incidence rates were highest in infants <1 year (8.2/100,000) and elderly adults, 65 years of age and greater (2.6/100,000), followed by the 5-9 year old age group (2.1/100,000) (table 1).

Cases occurring in children <10 years of age (n=15) and elderly adults >65 years (n=12) accounted for 71% of the invasive *H. influenzae* notifications in 2006 (table 1)

The clinical manifestations of invasive *H. influenzae* disease in the 15 children in 2006 were septicaemia (n=4), meningitis (n=3), meningitis and septicaemia (n=1), epiglottitis (n=3), cellulitis (n=2) and clinical diagnosis not reported (n=2).

Two invasive *H. influenzae* related deaths were reported in 2006, both associated with non-capsular strains, one presenting as meningitis the other as pneumonia. One death was in an adult, the other was in a young child in the 1-4 years age group.

H. influenzae type b (Hib) accounted for 37% of the invasive *H. influenzae* notifications in 2006, with 14 cases being notified (0.3/100,000 total population). The majority of the Hib cases were in children (n=8, 57%),

with 4 cases occurring in infants <1 year, one in 1-4 years age group and three cases in 5-9 years age group.

In 2005, 18 Hib cases were notified, with 14 (77%) occurring in children <10 years of age. However, in contrast with 2006 when just one Hib case occurred in a child aged between 1-4 years, 12 such cases occurred in this age group in 2005. The introduction of a Hib booster catch-up campaign for children under 4 years of age in November 2005 therefore had an obvious impact in reducing the incidence of Hib disease in young children in 2006.

In 2006, four true Hib vaccine failures occurred, where Hib disease occurred in children aged between 2 and 7 years of age. These children had each received three doses of Hib vaccine when they were less than one year of age. This number of failures was a dramatic decrease compared with 2005, when 14 true vaccine failures arose; highlighting once more the positive impact the Hib booster catch-up campaign has had in Ireland.

Of note in 2006, was the fact that three of the four true vaccine failures occurred in slightly older children, aged 5-7 years who would not have been targeted by the catch-up programme. In 2005, 11 of the 14 true vaccine failures occurred in children <4 years of age.

In 2006, there were three apparent Hib vaccine failures compared to one in 2005. These failures occurred in children who had been incompletely immunised, all <1 year of age and each only having received one dose of Hib vaccine.

In September 2006, a Hib booster dose at 12 months of age was introduced to the routine childhood immunisation schedule in addition to the three doses at 2, 4 and 6 months of age.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 16th July 2007. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

A more detailed report is available at www.hpsc.ie, under the disease name in Topics A-Z.

EU information is available at www.euibis.org

Table 1. Number and incidence rates of invasive Haemophilus influenzae cases by serotype and age group and number of Hib vaccine failures by age group, 2006

	Type b	Type e	Non capsular	Not typed	Total	ASIR of Hib *H. influenzae*	ASIR of all	TVFs
<1	4	0	1	0	5	6.5	8.2	0
1-4	1	0	3	0	4	0.4	1.7	1
5-9	3	0	3	0	6	1.0	2.1	3
10-19	0	0	0	0	0	0.0	0.0	0
20-54	5	0	1	0	6	0.2	0.3	0
55-64	1	1	3	0	5	0.2	1.2	0
65+	0	1	9	2	12	0.0	2.6	0
All ages	**14**	**2**	**20**	**2**	**38**	**0.3**		**4**
CIR	0.3	0.05	0.5	0.05	0.9	-	-	-

CIR, crude incidence rate per 100,000 total population
ASIR, age specific incidence rate per 100,000
TVFs, true Hib vaccine failures

1.2 Measles

Summary

Number of notifications, 2006: 83
Number of confirmed notifications, 2006: 24
Crude incidence rate, 2006: 2.0/100,000
Crude confirmed incidence rate, 2006: 0.6/100,000

There were 83 measles notifications in 2006, giving a crude incidence rate of 2.0 per 100,000 population. This is a slight decrease compared to 2005 when 93 measles cases (2.2/100,000) were notified. In contrast, there were 330 (7.8/100,000) measles notifications in 2004 and 572 (14.6/100,000) in 2003. The annual number of notifications in 2006 is the lowest since measles was specified as a notifiable disease under the Health Act, 1947 (figure 1).

Of the 83 notifications in 2006, 24 (29%) were classified as confirmed, 55 (66%) as possible while case classification was not provided for four (5%) notifications. All 24 notifications (0.6/100,000) classified as confirmed were laboratory confirmed.

Measles notifications were reported in both children and adults in 2006 with cases ranging in age from four months to 55 years (age was unknown/not reported for two cases). Seventy-five percent (n=62) of cases occurred in children less than three years of age with 35% (n=29) in those less than one year of age (table 1). The highest incidence rates in 2006 were in those aged less than one year (47.5/100,000) and one to two years (27.2/100,000) (table 1).

Of the 83 measles notifications, 44 were male, 38 were female, while sex was not reported for one notification.

Laboratory results were provided for only 39 (47%) of the measles notifications. Twenty-four of these were positive for measles; the number of laboratory confirmed cases by age group is presented in table 1. Twelve tests were negative for measles (the specimen date was not reported for one of these cases) while the results for two cases were inconclusive. For an additional case the laboratory result was negative, however, this may be a false negative result as the serum specimen was taken one day following onset (serum specimens obtained less than four days following the appearance of the rash may lead to false negative results). All cases (n=15) that were reported as negative

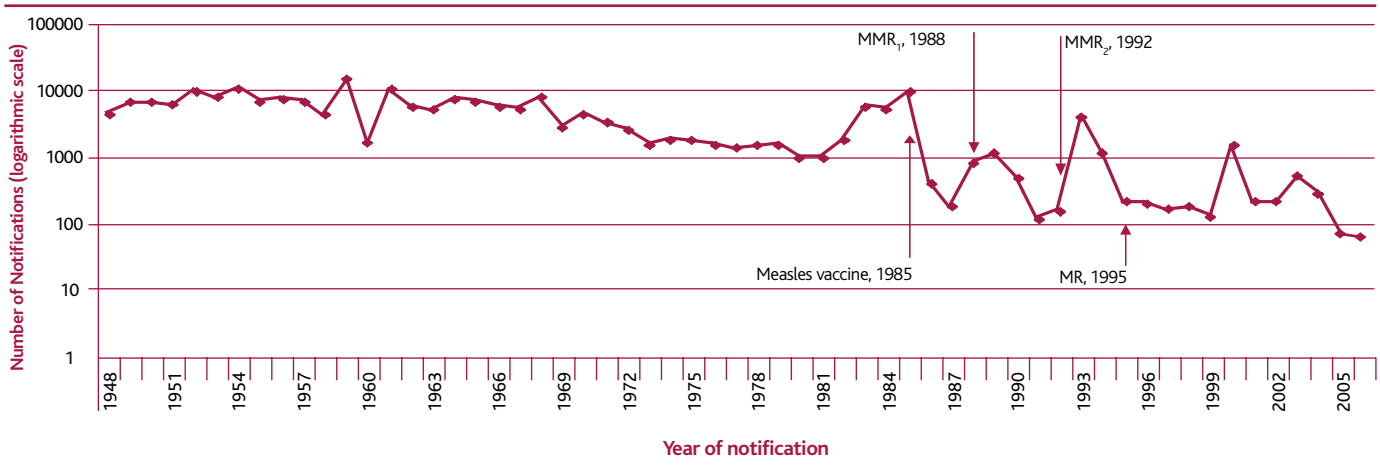

Figure 1. Annual number (logarithmic scale) of measles notifications in Ireland 1948-2006 and year of introduction of measles and MMR vaccine (A measles and rubella campaign for primary school-age children was conducted in 1995)
1948-June 2000 data collated by DoHC
July 2000-2006 data collated by HPSC

or inconclusive were classified as possible measles cases.

Measles vaccine in Ireland is available as part of the combined measles-mumps-rubella (MMR) vaccine. In Ireland, vaccination with the first dose of MMR (MMR_1) is recommended at twelve to fifteen months of age and the second dose (MMR_2) at four to five years of age.

MMR vaccination status was only reported for 44 (53%) of the 83 notifications in 2006 (table 1). Twenty-nine cases (n=29/44, 66%) were unvaccinated. Four (n=4/29, 14%) of those unvaccinated were between 22 months and eight years of age and therefore were not age appropriately vaccinated (assuming there were no contraindications to vaccination).

Eight cases (n=8/44, 18%) were vaccinated with MMR_1 only. Only one of these cases was laboratory confirmed. One of these cases was aged greater than six years and therefore was not age appropriately vaccinated. All eight cases vaccinated with MMR_1 were vaccinated greater than one month prior to onset. An additional three cases received at least one dose of MMR. These cases were aged between 15 months and three years.

The MMR_1 vaccination dates were reported for two of these notifications; both were vaccinated greater than two months prior to onset. All three cases were classified as possible cases.

Four cases received MMR_2. The dates of vaccination were only reported for two of these cases; both cases were vaccinated greater than three months prior to onset. None of these four cases were reported as laboratory confirmed; therefore, none are known to be, or can be, classified as vaccine failures based on the data provided.

Information on hospitalisation status was available for 37 (45%) cases. Four cases were hospitalised representing 11% of all cases with known hospitalisation status. The hospitalised cases ranged in age from one to four years. Laboratory results were reported for three of the hospitalised cases, all three were laboratory confirmed.

Of the four hospitalised cases two were unvaccinated (both were aged less than 16 months), one had received one dose of MMR (case aged less than six years) while the vaccination status was unknown/not reported for one case.

Table 1. Number of measles notifications by age group and vaccination status, the age specific incidence rate per 100,000 population (ASIR) and number of laboratory confirmed cases by age group

Age Group	Vaccination Status					Total	ASIR	Laboratory Confirmed Cases
(Year/s)	None	MMR_1*	MMR_1†	MMR_2	Unknown/ Not reported			
<1	18	0	0	0	11	29	47.5	9
1-2	6	5	2	1	19	33	27.2	7
3-4	2	2	1	0	4	9	7.5	3
5-9	1	0	0	2	1	4	1.4	1
10-14	0	1	0	0	0	1	0.4	0
15-19	0	0	0	0	1	1	0.3	1
20-24	0	0	0	0	0	0	0	0
25+	2	0	0	0	2	4	0.1	3
Unknown	0	0	0	1	1	2	-	0
Total	**29**	**8**	**3**	**4**	**39**	**83**	**2.0‡**	**24**

**Received one dose of MMR only*
†Received at least one dose of MMR
‡Crude incidence rate per 100,000 population

Information on measles associated complications was reported for 15 (18%) cases. One case, aged three years, was reported to have pneumonia. The 14 remaining cases were reported to have no complications. No measles deaths were reported among the 83 measles notifications.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) System on 21st August 2007 and may differ from those published previously due to ongoing updating of notification data on CIDR.

A more detailed report is available at www.hpsc.ie, under the disease name in Topics A-Z.

EU data are available at www.euvac.net and WHO European data are available at http://data.euro.who.int/CISID/.

1.3 Meningococcal Disease

Summary

Number of cases, 2006: 210
Number of cases, 2005: 203
Crude incidence rate, 2006: 5.0/100,000

In 2006, 210 cases (5.0/100,000) cases of invasive meningococcal disease (IMD) were notified in Ireland. This was a very slight increase from the previous two years when 203 cases (4.8/100,000) and 198 cases (4.7/100,000), were notified in 2005 and 2004, respectively (figure 1). The epidemiology of IMD has therefore, remained largely unchanged over the last three years. However, when compared with the rates reported in 1999 and 2000, incidence rates have substantially declined in recent years (figure 1).

Based on the meningococcal disease case definition, 173 of the 210 cases notified in 2006 were classified as definite, seven as presumed and 30 as possible. Eighty-eight percent (184/210) of the cases were laboratory confirmed. The majority were confirmed by PCR alone (57%, n=105). Confirmation of the remaining cases was by culture alone (n=17), PCR and culture (n=52), serology (n=5) and microscopy (n=5).

In 2006, male cases (n=128) exceeded female cases (n=82), resulting in a male to female ratio of 1.6:1.0. Cases ranged in age from two weeks to 84 years, with a median age of two years. The incidence of IMD was highest in infants and young children. Infants <1 year of age had an age specific rate of 86.8 per 100,000, followed by the 1-2 year olds (46.2/100,000) and then the 15-19 year olds (10.3/100,000) (table 1).

Neisseria meningitidis serogroup B was the pathogen most commonly associated with IMD in 2006 and accounted for 80% (n=169) of the notifications (figure 1). Each year since 2003 serogroup B has accounted for 80% or more of the IMD notifications (figure 1).

IMD due to serogroup C has remained at very low levels over the last four years with no more than five cases occurring annually. In 2006, just four (0.09/100,000) serogroup C cases arose (figure 1). One case occurred in a young child, while the remaining three were in adults (age range 22-84 years).

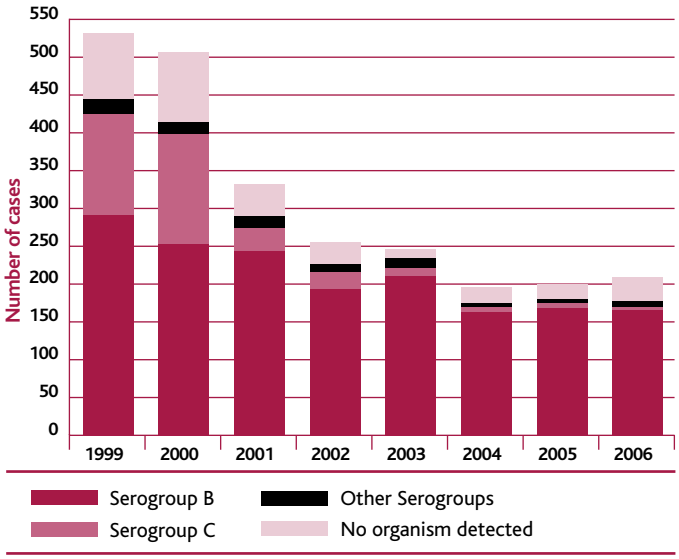

Figure 1. Number of invasive meningococcal disease notification in Ireland by serogroup, 1999-2006

These low incidence rates highlight the huge impact the introduction of the MenC conjugate vaccine in October 2000 has had in almost eliminating IMD due to serogroup C (figure 1). Prior to the introduction of this vaccine, serogroup C incidence rates were 3.5 per 100,000 total population.

One of the four serogroup C cases notified in 2006 arose in a child that had been fully vaccinated as an infant and therefore this case was regarded as a true MenC vaccine failure. The remaining three serogroup C cases had not been vaccinated. One MenC vaccine failure also occurred in 2005, while no failures arose in either 2004 or 2003.

There were five IMD related deaths in 2006 (case fatality ratio of 2.4%) compared to six in 2005 and 10 in 2004. The case fatality ratio (CFR) was highest in the 20-24 year old age group, 11.1% as a result of one death from nine cases (table 1). Similar CFRs occurred in infants <1 year of age (3.8%) and young children aged 1-2 years (3.6%). The deaths in 2006 were all due to serogroup B disease. Four of the deaths (80%) occurred in children <3 years of age and the remaining one was in a young adult (table 1). No serogroup C deaths occurred in either 2005 or 2006 while one each occurred in 2003 and 2004, both in middle aged adults. No young person has died from serogroup C disease in Ireland since 2001. Thus, the introduction of the MenC vaccine has also substantially reduced mortality due to serogroup C disease in Ireland.

Despite a reduction in the overall incidence of IMD in recent years, this disease continues to be treated as a serious public health concern due to its severity, high mortality rate and serious adverse sequelae associated with it.

Effective vaccination is necessary for the complete prevention and control of meningococcal disease. Although effective vaccines are available against serogroups A, C, W135 and Y forms of the disease, a suitable vaccine against serogroup B disease, the most common form of the disease in Ireland, is not yet available. Until such time that an effective MenB vaccine, suitable for use in infants, is on the market, IMD remains a significant cause of morbidity and mortality in children and young adults in Ireland.

Table 1. Number of cases, deaths, incidence rates and case fatality ratios, by age group, of invasive meningococcal disease in Ireland, 2006

	No. Cases	ASIR	No. Deaths	CFR (%)
<1	53	86.8	2	3.8
1-2	56	46.2	2	3.6
3-4	11	9.2	0	0
5-9	17	5.9	0	0
10-14	11	4.0	0	0
15-19	30	10.3	0	0
20-24	9	2.6	1	11.1
25+	23	0.8	0	0
All ages	**210**	**5.0**	**5**	**2.4**

ASIR, age specific incidence rate of cases per 100,000
CFR, case fatality ratio

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 1st August 2007. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

A more detailed report is available at www.hpsc.ie, under the disease name in Topics A-Z.

EU information is available at www.euibis.org

1.4 Mumps

Summary

Number of notifications, 2006: 426
Crude incidence rate, 2006: 10/100,000
Number of outbreaks notified, 2006: 5

A national mumps outbreak that began in Ireland in November 2004 and continued throughout 2005 waned in the later half of 2006 (figure 1). There were a total of 426 (10.0/100,000) mumps notifications during 2006 with an average of approximately five notifications each week from June to December 2006. In comparison, there were 422 (10.0/100,000) mumps notifications during 2004 and 1,080 (25.5/100,000) in 2005 with an average of 23 mumps notifications each week from early November 2004 to the end of 2005. However, the number of notifications in 2006 was still a ten-fold increase when compared to 2003 when there were a total of 40 mumps notifications.

In 2006, of the 426 mumps notifications 209 (49%) were classified as confirmed, 45 (11%) as probable and 161 (38%) as possible. Case classification was not provided for 11 notifications.

A breakdown of mumps notifications by age group and the age specific incidence rates per 100,000 population from 2003 to 2006 are presented in table 1. In 2006 there were fewer cases in all age groups less than 55 years of age compared to 2005 but more cases in all age groups compared to 2003. The majority (73%, n=311/426) of cases in 2006 were aged between 10 and 34 years with 41% (n=175/426) aged between 14 and 21 years. There were 27 mumps notifications in 2006 in those aged greater than 44 years, 21 of these were laboratory confirmed. Only two of the 426 notifications were less than one year of age.

Of the 426 mumps notifications 258 (61%) were male and 168 (39%) were female.

Where the case most likely acquired mumps was reported for 87 notifications; for 53% (n=46) secondary school or college/university was reported as the place the infection was most likely acquired.

Of the 209 mumps notifications where vaccination status was reported 41% (n=85/209) were unvaccinated, 28% (n=59/209) had one dose of the measles-mumps-rubella vaccine (MMR_1) and 29% (n=60/209) were reported to have received two doses (MMR_2). An additional five

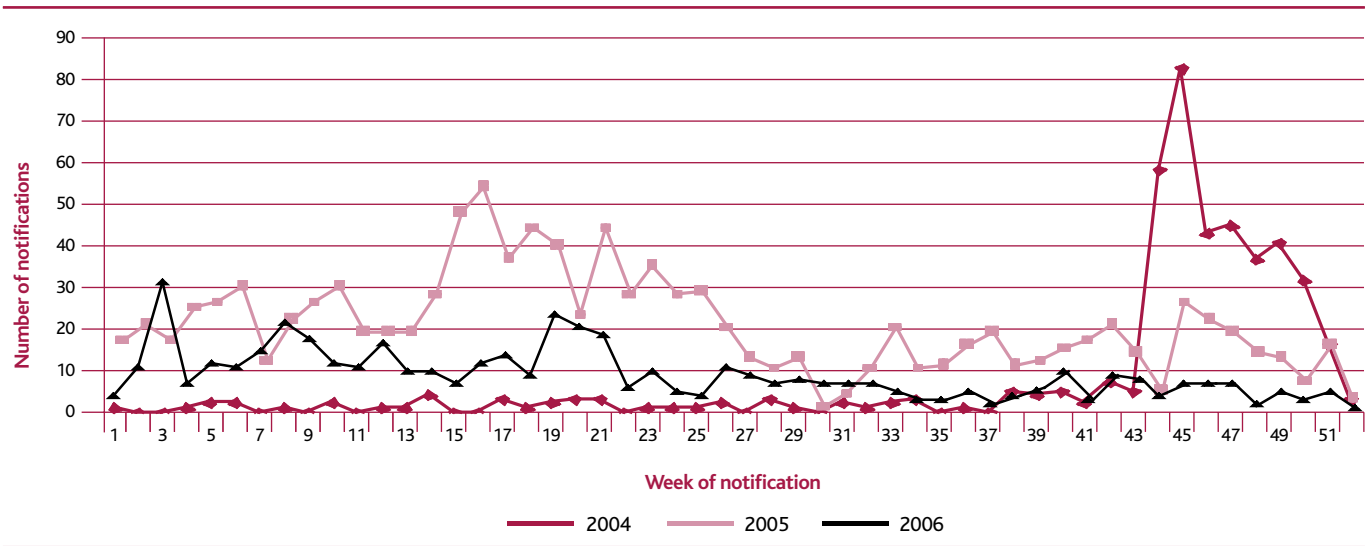

Figure 1. Number of mumps notifications by week and year, 2004-2006

cases (2%) had at least one dose of MMR. For a large proportion of these cases the vaccination status was not confirmed, as the dates of vaccination or vaccination batch numbers were not reported. Of the cases reported to have received one dose of MMR (or at least one dose of MMR) 55% (n=35/64) had the MMR_1 vaccination date reported and only 25% (n=16/64) had the MMR batch number reported. Both vaccination dates were only reported for 38% (n=23/60) of cases vaccinated with MMR_2 and only 12% (n=7/60) had both MMR batch numbers reported. Of the cases reported to have received MMR_2 only 23% (n=14/60) were reported as laboratory confirmed.

Information on hospitalisation status was available for 218 notifications. Thirty-two cases were hospitalised, representing 15 percent of all cases with known hospitalisation status. Reported complications of mumps included orchitis (20%, n=18/91), meningitis (4%, n=6/149), mastitis (1.6%, n=2/127), oophoritis (1.6%, n=1/61), pancreatitis (0.8%, n=1/123) and deafness (0.7%, n=1/145). No cases of encephalitis due to mumps were reported (n=0/147).

Five outbreaks of mumps were notified during 2006. All five were notified during January to March of 2006. The outbreak location was reported as a school for two outbreaks (with five and nine cases reported ill in each outbreak), a community (with 15 ill), a private house (with two ill) and a workplace (with two ill).

The majority of figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 22nd August 2007. These figures may differ from those published previously due to ongoing updating of notification data on CIDR. Data on complications, hospitalisation, vaccination and where the case most likely acquired mumps were taken from both CIDR and the Microsoft Access enhanced mumps database at HPSC.

A more detailed report is available at www.hpsc.ie, under the disease name in Topics A-Z.

Table 1. Number of mumps notifications by age group and the age specific incidence rate per 100,000 population (ASIR) by year from 2003-2006

Age Group (Years)	2003		2004		2005		2006	
	Number	ASIR	Number	ASIR	Number	ASIR	Number	ASIR
0-4	11	4.0	23	7.6	49	16.2	33	10.9
5-9	8	3.0	8	2.8	86	29.8	33	11.4
10-14	3	1.1	24	8.8	108	39.4	58	21.2
15-19	6	1.9	115	39.6	323	111.3	99	34.1
20-24	3	0.9	129	37.7	300	87.6	90	26.3
25-34	4	0.6	45	6.2	135	18.7	64	8.9
35-44	1	0.2	17	2.7	32	5.1	20	3.2
45-54	1	0.2	7	1.3	22	4.2	11	2.1
55-64	0	0.0	4	1.0	8	2.0	8	2.0
65+	1	0.2	2	0.4	5	1.1	8	1.7
Unknown	2	-	48	-	12	-	2	-
Total	**40**	**1.0***	**422**	**10.0***	**1080**	**25.5***	**426**	**10.0***

**Crude incidence rate per 100,000 population*

1.5 Other forms of Bacterial Meningitis

Summary

Number of other forms of bacterial meningitis 2006: 81

Meningitis due to *Streptococcus pneumoniae* accounted for over a quarter of these notifications.

Apart from *Neisseria meningitidis*, which is considered, the most common cause of bacterial meningitis in Ireland, other forms of the disease do occur. Details of these are presented below. For details on invasive meningococcal disease (which includes *N. meningitidis* meningitis), see a separate chapter within this report.

Streptococcus pneumoniae

In 2006, 23 cases of pneumococcal meningitis were notified, compared to 19 in 2005 and 22 in 2004. Cases in 2006 ranged in age from one month to 80 years. There were three pneumococcal meningitis related deaths, all were in adults. See a separate chapter on invasive pneumococcal disease for further details.

Haemophilus influenzae

In 2006, four cases of meningitis due to *H. influenzae* were notified. Three cases were in young infants, age <6 months and all were due to *H. influenzae* type b. The fourth case was due to *H. influenzae* non-capsular, aged two years, and this patient died. See a separate chapter on invasive *H. influenzae* disease for further details.

Group B streptococci

Four cases of meningitis due to *Streptococcus agalactiae* were notified in 2006. All were neonatal cases. No deaths were reported.

Escherichia coli

Three cases of *E. coli* meningitis were notified in 2006. Two were neonatal cases and one was in an older infant, <1 years old.

Mycobacterium tuberculosis

In 2006, six *M. tuberculosis* meningitis cases were notified (provisional figure). Cases ranged in age from

Table 1. Annual number of other forms of bacterial meningitis notified

Notified under	Causative Pathogen	2004	2005	2006
Streptococcus pneumoniae infection (invasive)	*S. pneumoniae*	22	19	23
Haemophilus influenzae disease (invasive)	*H. influenzae*	4	9	4
Listeriosis	*L. monocytogenes*	1	1	1
Streptococcus group A infection (invasive)	*S. pyogenes*	0	1	1
Tuberculosis	*M. tuberculosis*	6	9	6*
Bacterial meningitis (not otherwise specified)	*E. coli*	1	0	3
	K. pneumoniae	0	0	1
	P. aeruginosa	1	1	0
	S. aureus	0	1	1
	Staphylococcus coagulase negative	0	0	1
	S. agalactiae (Group B streptococcus)	6	5	4
	Streptococcus Group C	0	1	0
	Unknown	28	22	36
	Total BacMen (nos)	**36**	**30**	**46**
Other forms of bacterial meningitis	**Total**	**69**	**69**	**81**

** TB meningitis figure for 2006 is provisional*

1-74 years (4 children and 2 adults). No deaths were reported.

Other causative pathogens
Cases of bacterial meningitis due to other pathogens were also notified in 2006. One meningitis notification for each of the following was received: *Listeria monocytogenes* in an adult, *Klebsiella pneumoniae* in a neonate, *Staphylococcus aureus* in a one year old, coagulase negative staphylococcus in an infant and *Streptococcus pyogenes* (group A streptococcus) in a teenager.

Bacterial meningitis (not otherwise specified)
In total 46 cases of meningitis under this disease category were notified in 2006. The causative pathogens were identified in 10 of these and are detailed above (see group B streptococci, *E. coli*, *K. pneumoniae*, *S. aureus* and coagulase negative staphylococcus). No causative pathogen was identified for 36 of the notifications, an increase compared to 2005 (n=22) and 2004 (n=28).

A marked increase in viral meningitis activity was also seen in 2006, with 148 cases being notified compared to 35 cases in 2005 (see separate chapter for further details). There is a possibility that some of the bacterial meningitis cases of unknown aetiology reported in 2006 may in fact be viral meningitis cases but could not be distinguished clinically, hence explaining the increase in the former.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting system (CIDR) on 31st August 2007. These figures may differ from those published previously due to ongoing updating of notification data on CIDR. The TB meningitis figures were obtained from the National Tuberculosis Surveillance System (NTBSS).

1.6 Pertussis

Summary

Number of notifications, 2006: 62
Number of notifications, 2005: 83
Crude incidence rate, 2006: 1.5/100,000

Sixty-two cases (1.5/100,000) of pertussis were notified in 2006 compared to 83 in 2005. Of the 62 cases in 2006 38 were classified as confirmed, five as probable, 15 as possible while case classification was not reported for four.

In 2006, cases ranged in age from one month to 57 years. The majority of cases (n=34, 55%) were in children aged less than one year (table 1) with half (n=31) of all pertussis notifications in children less than six months of age. The highest incidence rate (55.7/100,000) was also in children aged less than one year (table 1). Three cases were aged between 38 and 57 years, two of these were classified as confirmed. Thirty-three cases were female and 29 were male.

Pertussis vaccine in Ireland is available as part of the combined diphtheria-tetanus-pertussis (DTaP) vaccine. Children should be vaccinated at two, four and six months of age and at four to five years. A full course of vaccine confers protection in over 80% of recipients. In those not fully protected the disease is usually less severe.

Fifteen of the cases in 2006 were reported as unvaccinated, these cases were aged between one month and 53 years. Five cases were reported as completely vaccinated for their age, only one of these was laboratory confirmed. These five cases were aged between one and four years. Nine cases had received at least one dose of pertussis vaccine but not the complete four doses; these cases were aged between two months and five years. Vaccination status was not reported for the remainder of cases (n=33).

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 23rd August 2007. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

Table 1. Number of pertussis notifications by age group, the age specific incidence rate of all pertussis notifications per 100,000 population (ASIR) and the number of confirmed pertussis notifications in 2006

Age Group (Year/s)	Number of Notifications	ASIR	Number of Confirmed Notifications
<1	34	55.7	27
1-2	5	4.1	2
3-4	11	9.2	4
5-9	6	2.1	2
10-14	3	1.1	1
15-19	0	0.0	0
20+	3	0.1	2
Total	**62**	**1.5***	**38**

**Crude incidence rate per 100,000 population*

1.7 Rubella

Summary

Number of notifications, 2006: 14
Number of notifications, 2005: 17
Crude incidence rate, 2006: 0.3/100,000

In 2006, 14 cases of rubella were notified in Ireland, giving a crude incidence rate of 0.3 per 100,000 total population. The number of rubella notifications in 2006 is the lowest since rubella was specified as a notifiable disease under the Health Act, 1947 (figure 1).

Only one of the cases in 2006 was classified as confirmed, 12 were classified as possible while case classification was not reported for one case.

Cases ranged in age from six months to 51 years. The majority of cases (n=9, 64%) and the highest incidence rate (14.9/100,000) were in children one year of age (table 1). Six cases were female and eight were male.

Rubella vaccine in Ireland is available as part of the combined measles-mumps-rubella (MMR) vaccine. In Ireland, vaccination with the first dose of MMR (MMR_1) is recommended at twelve to fifteen months of age and the second dose (MMR_2) at four to five years of age.

Vaccination status was reported for eight of the rubella notifications in 2006. Four were unvaccinated, all four were aged 12 months or less. Four were reported as completely vaccinated for their age; all four were between 16 and 20 months of age.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 23rd August 2007 and may differ from those published previously due to ongoing updating of notification data on CIDR.

Table 1. Number of rubella notifications by age group and the age specific incidence rate per 100,000 population (ASIR) in 2006

Age Group (Year/s)	Number	ASIR
<1	2	3.27
1	9	14.89
2-4	0	0.00
5-9	1	0.35
10-14	1	0.37
15-19	0	0.00
20+	1	0.03
Total	**14**	**0.33***

**Crude incidence rate per 100,000 population*

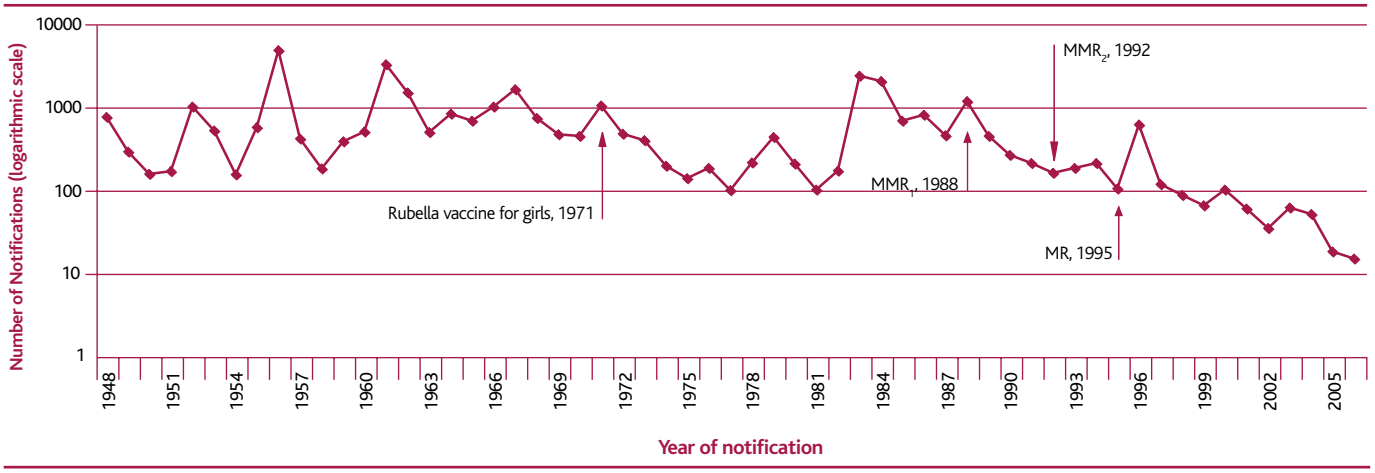

Figure 1. Annual number (logarithmic scale) of rubella notifications in Ireland 1948-2006 and year of introduction of rubella and MMR vaccine (A measles and rubella campaign for primary school-age children was conducted in 1995)
1948-June 2000 data collated by DoHC
July 2000-2006 data collated by HPSC

1.8 *Streptococcus pneumoniae* (invasive)

Summary

Number of cases, 2006: 293
Number of cases, 2005: 271
Crude incidence rate, 2006: 6.9/100,000

Invasive infections due to *Streptococcus pneumoniae* are notifiable in Ireland since 1st January 2004, with clinicians and laboratories legally obliged to notify. For the purposes of this report the term invasive pneumococcal disease (IPD) will be used to describe these infections.

In 2006, 293 cases of IPD (6.9/100,000) were notified in Ireland. This was an increase from 2005 and 2004, when 271 (6.4/100,000) and 175 (4.1/100,000) cases were notified, respectively (figure 1). The number of invasive *S. pneumoniae* isolates reported by the European Antimicrobial Surveillance System (EARSS) in 2004-2006 has remained stable at approximately 400 per annum. This would indicate that the increase in notifications observed over this period is more likely a reflection of improved reporting rather than any change in the IPD trends *per se* (figure 1).

In 2006, 247 cases of IPD were classified as confirmed, 34 as probable and 12 as possible. The clinical diagnosis was reported for just 55 of the cases. The clinical manifestations of the disease were meningitis (n=18), septicaemia (n=17), meningitis and septicaemia (n=5), pneumonia (n=14) and peritonitis (n=1). For the remaining 238 IPD notifications, clinical diagnosis was not reported.

In 2006, more IPD cases occurred in males (n=166) than in females (n=127), therefore the male to female ratio was 1.3:1.0. Cases ranged in age from one month to 100 years, with a median age of 52.5 years. Over half of the IPD cases notified occurred in the very young or the very old; 19.5% (n=57) of cases were in children <5 years of age and 34.1% (n=100) were in elderly adults ≥65 years (figure 2).

In children the burden of IPD was highest in infants <1 year of age (44.2/100.000), followed by the 1-2 year olds (19.0/100,000). Thereafter, the incidence dropped to <10 cases per 100,000 population for those in the 3-59 years age groups (figure 2). From the age of 60 years onwards the incidence of IPD increased with increasing age, from 11 cases per 100,000 population in 60-64 year olds, rising to 23.8 per 100,000 in 75-79 year

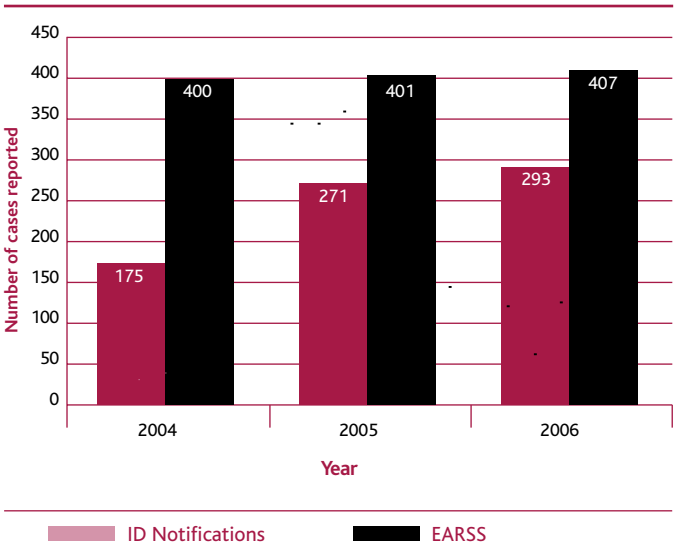

Figure 1. Annual number of invasive pneumococcal disease cases reported through the infectious disease notification system and EARSS, 2004-2006

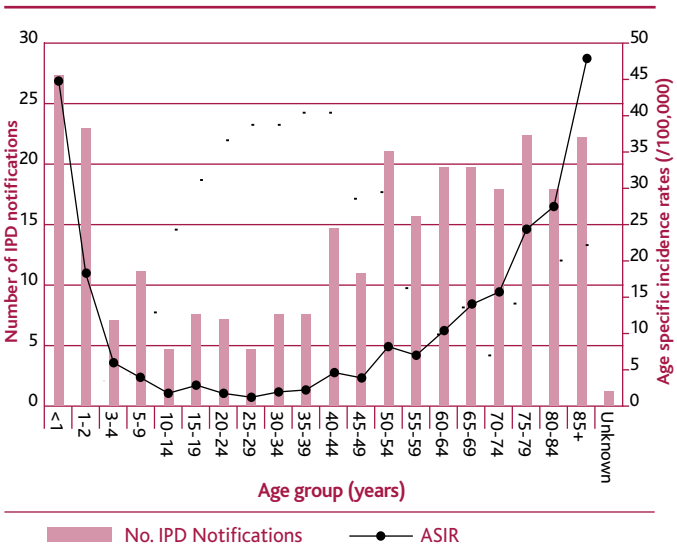

Figure 2. Number and age specific incidence rates of IPD notifications by age group, 2006

olds and reaching the highest incidence rate in those 85 years and older, at 45.8 cases per 100,000 population (figure 2).

In 2006, just 15% (60/407) of all *S. pneumoniae* isolates reported through EARSS were serotyped, with five of the 42 laboratories participating. The predominant types identified were 6B, 4, 1, 3, 9V and 14. These accounted for 58% of the serotyped isolates. The 23-valent pneumococcal polysaccharide vaccine, PPV23, would have covered 98% of the isolates serotyped while 55% would have been covered by the 7-valent pneumococcal conjugate vaccine, PCV7. In children under 2 years of age, 79% of isolates serotyped belonged to types covered by PCV7 and in adults 65 years of age or more, 95% of the isolates serotyped would have been covered by PPV23.

Seven deaths due to IPD were reported in 2006. Three deaths occurred in patients with meningitis, three with pneumonia and one with septicaemia. All deaths were in adults, age range 43-80 years, and five of these deaths were in elderly adults >65 years of age. It should be noted that outcome was unknown or not reported for the vast majority of the IPD notifications (90%, 264/293), so the figures presented may underestimate mortality due to IPD in Ireland.

The notification figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 9th August 2007. These figures may differ from those published previously due to ongoing updating of notification data on CIDR. EARSS data was obtained from the Whonet database at HPSC.

A more detailed report is available at www.hpsc.ie, under the disease name in Topics A-Z.

02

Respiratory and Direct Contact Diseases

2.1 Influenza

Summary

2006/2007 Influenza Season

Number of influenza-like illness cases: 821
% of influenza positive sentinel specimens: 35.9
Dominant circulating subtype: A(H3)
Strains identified: A/Wisconsin/67/2005 & A/Hiroshima/52/2005

HPSC is working in collaboration with the NVRL, the ICGP and the Departments of Public Health on the influenza sentinel surveillance project. Forty-eight general practices (located in all HSE Areas) were recruited to report electronically, on a weekly basis, the number of patients who consulted with influenza-like illness (ILI). Sentinel GPs were requested to send a combined nasal and throat swab on at least one ILI patient per week to the NVRL. Other indicators of influenza activity include a network of sentinel hospitals reporting admission levels, sentinel schools reporting absenteeism and enhanced surveillance of hospitalised influenza cases in 0-14 year olds. This report details ILI/influenza data for the 2006/2007 season (Oct 2006-May 2007)

Influenza activity in Ireland peaked slightly earlier in the 2006/2007 influenza season compared to the previous season. Activity was moderate for most of the season, with a peak during week 7 2007 at 67.6 per 100,000 population (figure 1). During the peak of activity, the majority of ILI cases reported were in the 0-4 and 15-64 year age groups.

The NVRL tested 351 sentinel specimens for influenza virus during the 2006/2007 season. One hundred and twenty-six (35.9%) sentinel specimens were positive for influenza: 124 influenza A (119 A(H3), 2 A(H1) and 3 A unsubtyped) and two influenza B.

The predominant influenza virus subtype identified was influenza A (H3), accounting for 96% of positive influenza A sentinel specimens. The majority of positive influenza sentinel cases were in the 15-64 year age group (82.3%). The NVRL also tested 1,824 non-sentinel respiratory specimens (predominantly paediatric, referred mainly from hospitals), 43 (2.4%) of which were positive for influenza A and 340 (18.6%) were positive for respiratory syncytial virus (RSV). The majority of non-sentinel influenza (65.1%) and RSV (93.1%) positive specimens were in the 0-4 year age group.

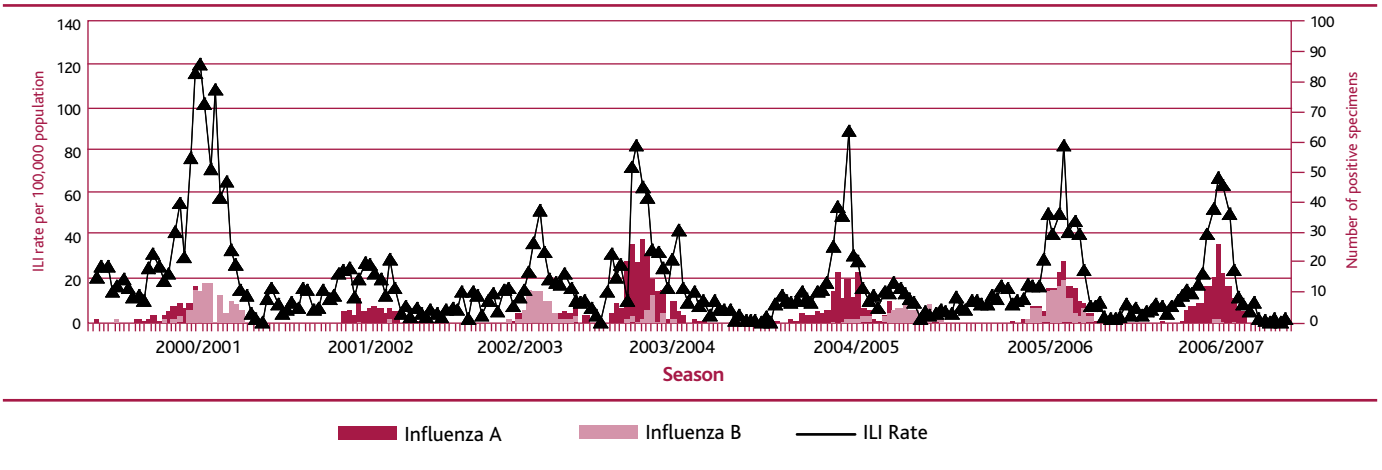

Figure 1. GP ILI consultation rate per 100,000 population and the number of positive influenza specimens detected by the NVRL by week for the 2000/2001, 2001/2002, 2002/2003, 2003/2004, 2004/2005, 2005/2006 & 2006/2007 influenza seasons

Of the 126 positive influenza virus detections from sentinel specimens, 106 (84.1%) were not vaccinated, 3 (2.4%) were vaccinated and vaccination status was unknown in 17 (13.5%) cases. Influenza A (H3) was detected in the three vaccinated cases.

Four influenza A (H3) specimens were sequenced at the NVRL and antigenic characterisation was undertaken at the WHO laboratory (Mill Hill) in London. All four influenza A (H3) strains were antigenically characterised as similar to the reference strains A/Wisconsin/67/2005 and A/Hiroshima/52/2005.

Regional influenza activity peaked during week 7 2007, with HSE-E, -MW and -SE all reporting localised influenza activity. Overall, influenza activity was most intense in HSE-E, -MW and -SE during the 2006/2007 season. The highest ILI consultation rates were observed in HSE-M, peaking during week 6 2007. During the 2006/2007 season, no ILI/influenza outbreaks were reported to HPSC.

Hospital respiratory admissions (as a proportion of total hospital admissions) in sentinel hospitals peaked during week 52 2006 (figure 2), following the seasonal peak in RSV. A similar peak in hospital respiratory admissions occurred during week 8 2007, one week after the peak in sentinel GP ILI consultation rates. Absenteeism in several sentinel schools was also at elevated levels during the peak in ILI consultation rates.

During the 2006/2007 season, the enhanced influenza dataset was included in CIDR. A total of 268 influenza notifications were reported on CIDR during the 2006/2007 season. Twenty-nine of these notifications were patients aged between 0-14 years who had been hospitalised. Enhanced data were completed for 27 (93%) of these cases. This compares to enhanced data received for 10 hospitalised influenza cases during the 2005/2006 season, all from HSE-E. During the 2006/2007 season, five cases were hospitalised in January, 14 in February, six in March and two in April 2007. One case was in the 5-14 year age group and 26 were in the 0-4 year age group, 19 of which were under one year of age and seven were in the 1-4 year age group. Ten cases were notified from HSE-E, four cases from HSE-M, 12 cases from HSE-NW and one case from HSE-SE. Twenty-six cases were positive for influenza A and one stated organism unknown. Complications included bronchitis, acute otitis media, secondary

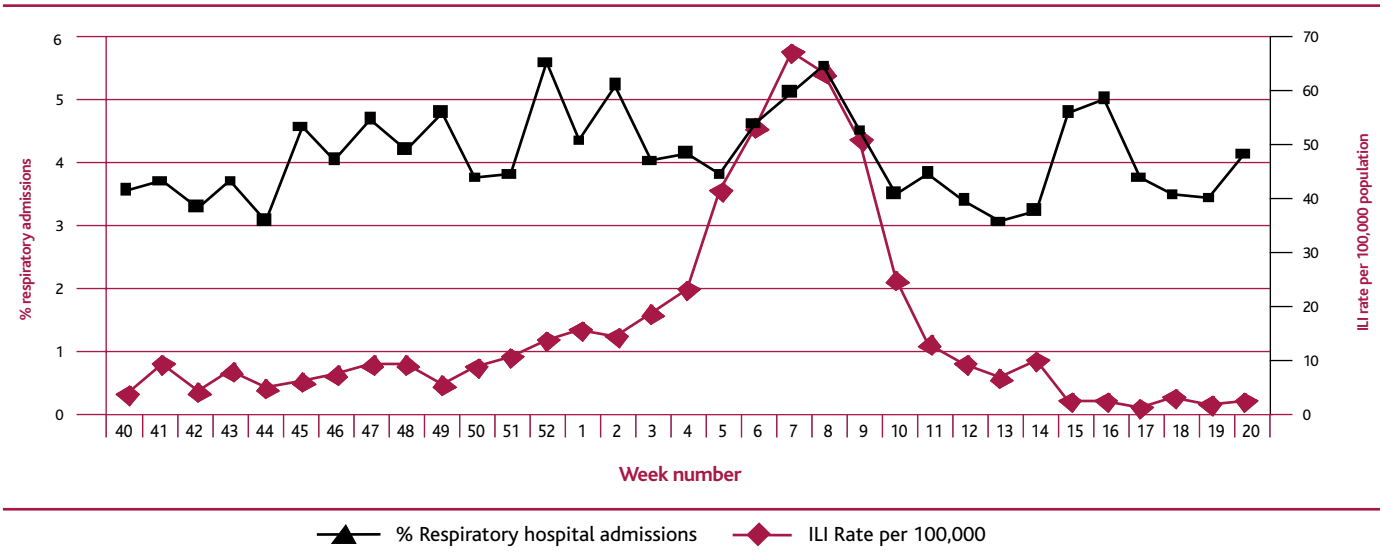

Figure 2. Respiratory admissions as a percentage of total hospital admissions in eight sentinel hospitals and GP ILI consultation rate per 100,000 population by week for the 2006/2007 influenza season

bacterial pneumonia, primary viral pneumonia, croup, liver dysfunction and other respiratory complications. The mean number of days in hospital was 5.3 (ranging from 1-32). Five cases were in at risk categories for influenza, none of whom were vaccinated. Outcome was recorded in 21 cases, 16 of whom recovered and five where outcome was unknown.

One death attributed to influenza was registered with the General Register Office during week 3 2007 (from HSE-MW). Influenza was the secondary cause of death and not the primary cause in this case. This death was registered during January 2007 but occurred during January 2006.

Activities that are being implemented to improve the surveillance of influenza include weekly surveillance of influenza and pneumonia registered deaths, monthly surveillance of influenza vaccine uptake data in those aged 65 years and older, and the construction of baseline and epidemic threshold levels for influenza activity in Ireland. Contact and attendance data is also currently being collated from GP Co-Operatives, to act as a crude indicator of influenza activity and a pilot project assessing the feasibility of using these data as an early warning tool has been completed by HSE-NE. A national tele-survey to estimate influenza and pneumococcal vaccine uptake and morbidity from ILI was carried out for the 2005/2006 influenza season. Case based reporting of avian influenza is now operational on CIDR and an interim MS Access database is being developed for contacts of avian influenza cases.

A more detailed report is available at www.hpsc.ie, under the disease name in Topics A-Z.

EU information is available at www.eiss.org

2.2 Legionellosis

Summary

Number of cases in 2006: 13
Crude incidence rate: 3.1/million
Number of deaths in 2006: 0

In 2006, 13 cases of legionnaires' disease were notified in Ireland, a rate of 3.1/million population. This was the highest rate recorded to date but the numbers are small (table 1). No deaths were recorded in 2006. Eight cases were notified from HSE East, two each from HSE North East and Mid-West, and one from HSE West.

The majority of cases (61.5%) were male. The median age was 47 years, with a range from 40 to 70 years.

There were twelve confirmed cases and one probable case. The organism involved was *Legionella pneumophila* serogroup 1 in twelve cases while the *Legionella* species was unknown in one case. Urinary antigen testing was the method of diagnosis in eleven cases and serology in two cases.

Of the 13 cases, four were community-acquired and nine were travel-associated. Countries of travel included France (2), Spain (2), Poland (2), Greece (1), Italy (1) and Ireland (1). A case of legionnaires' disease is defined as travel-associated if the patient spent one or more nights away from home in accommodation used for commercial purposes (hotels, holiday apartments) in the 10 days before onset of illness. Travel-associated cases may involve travel within Ireland or abroad.

Table 1. Number of legionnaires' disease cases per million population notified in Ireland, 2000-2006

Age group (years)	2000	2001	2002	2003	2004	2005	2006
<30	1	0	0	1	0	0	0
30-39	2	1	2	0	0	2	0
40-49	1	1	3	0	1	4	8
50-59	1	0	0	1	1	1	2
60-69	2	1	1	2	1	1	1
70+	2	0	0	3	1	1	2
Total	9	3	6	7	4	9	13
***CIR**	**2.3**	**0.8**	**1.5**	**1.8**	**0.9**	**2.1**	**3.1**

**CIR = crude incidence rate*

2.3 Invasive Group A Streptococcal Disease

Summary

Number of cases, 2006: 61
Number of cases, 2005: 49
Crude incidence rate, 2006: 1.4/100,000

There were 61 cases (1.4 per 100,000 population) of invasive group A streptococcal disease (iGAS – *Streptococcus pyogenes*) notified in 2006, a rise of 24% on the 49 cases (1.2/100,000) notified in 2005. This level is higher again from the 35 cases (0.8/100,000) reported in 2004 when iGAS first became notifiable in Ireland.

The average incidence rates over the last three years varied from 0.3 to 2.0 per 100,000 for the different HSE-Areas (table 1). There was a cluster of cases in early 2005 in HSE-W which could have lead to better reporting, in terms of frequency and quality of data, of iGAS in that area. The number of cases reported in 2006 in HSE-W was lower than in 2005 but was higher compared to other HSE areas. It is likely that the average 2004-2006 incidence rate for HSE-W of 2.0/100,000 is a truer indication of the level of iGAS in Ireland than the national rate. However, even this incidence rate remains lower than in the UK and other European countries (3.8/100,000).

In December 2006 iGAS enhanced fields, relating to isolate details, risk factors, and clinical and epidemiological features, were added to the CIDR system. Data from different HSE areas (including those that had not joined CIDR in 2006) were collected retrospectively. Enhanced data fields were entered for 41 (67%) of the 61 cases reported in 2006.

Bacteraemia (eight cases) and cellulitis (six cases) were common clinical features. Other clinical feature were: necrotising fasciitis (two cases), streptococcal toxic shock syndrome (three cases), and meningitis, myositis, septic arthritis, meningitis and puerperal sepsis (one case each).

Risk factors for iGAS included skin/wound lesions (seven cases), intravenous drug use (three cases) and steroid use (three cases). Other risk factors were alcoholism, malignancy and non-steroidal anti-inflammatory drugs (two cases each), and diabetes (one case). In one case varicella was recorded as a risk factor. Note that a

Table 1. Breakdown of notifications of iGAS in 2004 to 2006 by HSE Areas with incidence rates per 100,000 population.

HSE-Area	2004	2005	2006	Total over three years	Average incidence rate by area
Eastern	25	19	37	81	1.8
Midland	0	1	2	3	0.4
Mid-Western	0	3	2	5	0.5
North-Eastern	2	3	5	10	0.8
North-Western	0	3	1	4	0.6
South-Eastern	7	1	4	12	0.9
Southern	1	1	3	5	0.3
Western	0	18	7	25	2.0
Ireland	**35**	**49**	**61**	**145**	**1.1**
Incidence rate	0.8	1.2	1.4		

Figures correct as of 09/10/2007

patient could have one or more risk factor or clinical presentation.

One case was hospital-acquired. None of the cases were acquired abroad.

Ten patients were known to require surgical intervention and five intensive-care unit admission. Outcome was known in 22 patients. While 12 had recovered, 10 patients were known to have died.

The source of the isolate was known for 35 cases. *S. pyogenes* was isolated from blood in 31 of the cases, from deep tissue in three cases and cerebro-spinal fluid in one case. Strain typing data were only available for two isolates; both were serotype M-1. Antibiotic resistance data are not collected nationally.

A more detailed report is available at www.hpsc.ie, under the disease name in Topics A-Z.

EU information is available at www.strep-euro.lu.se

2.4 Tuberculosis, 2005

Summary

Number of cases, 2005: 450
Crude incidence rate, 2005: 10.6/100,000
Number of TB deaths, 2005: 10
Number of cases, 2006: 458
Crude incidence rate, 2006: 10.8/100,000

In 2005, 450 cases of tuberculosis were notified in Ireland, corresponding to a crude notification rate of 10.6 per 100,000 population. This is slightly higher than the rates reported between 2000 and 2004, which ranged from 9.7/100,000 to 10.4/100,000 population, but is lower than the crude incidence rates reported between 1991 and 1999, which ranged from 11.5/100,000 to 18.5/100,000. A summary of the epidemiology of TB in Ireland during 2005 is shown in table 1. Number of cases and crude incidence rates from 1991 to 2005 with three-year moving averages are also shown in figure 1.

The highest crude incidence rate was reported in HSE Mid-West at 14.7/100,000 population. The next highest rates were reported in HSE East (13.0), HSE South (12.2) and HSE West (10.9). The rates in HSE North East (3.3), HSE North West (6.3) and HSE Midlands (6.4) were significantly lower than the national rate.

Differences in age-standardised TB incidence rates were also found between HSE areas with HSE Mid-West having the highest rate in 2005 followed by HSE East and HSE South. HSE North East had the lowest rate in 2005, followed by the HSE North West and HSE Midlands.

The highest age-specific rate in 2005 occurred among those aged 65 years and over (19.0/100,000 population). This was similar to the rate observed in this age group between 2001-2004.

Rates among males were higher than females for all age groups. The highest rates among males (21.2/100,000) and females (17.3/100,000) were among those aged 65 years and over. The male to female ratio (1.5:1) reported in 2005 was consistent with the rate reported in 2004 (1.5:1).

During 2005, 33.8% of TB cases notified were born outside Ireland. This compares to 30% in 2004, 21.9% in 2003, 30.1% in 2002 and 16.5% in 2001. In 2005, among countries in the EU and Western Europe who reported data to the EuroTB network, 20% of notifications were

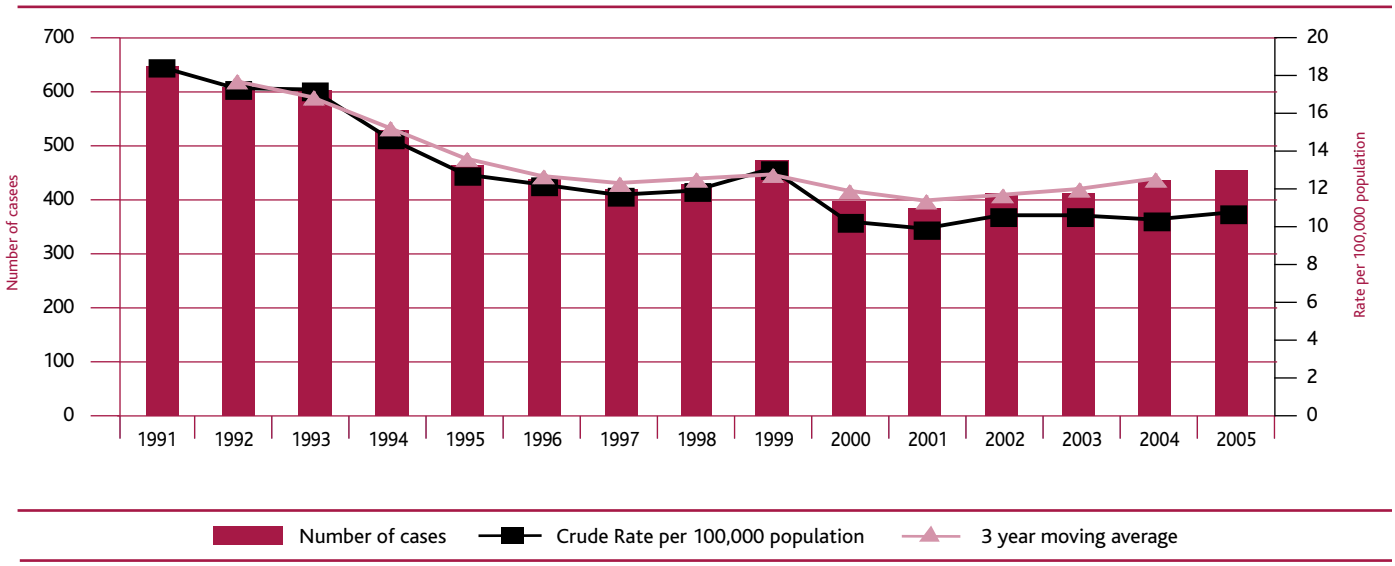

Figure 1: Notified cases of TB in Ireland with crude rates per 100,000 population, 1991-2005 and 3-year moving averages, 1992-2004

in foreign-born patients. In the United Kingdom, France, Germany and Belgium, where crude incidence rates are similar to those reported in Ireland, the percentage of cases of foreign origin in 2005 ranged from 43 to 64%. There was a notable difference in age between those born in Ireland and those born outside Ireland, with a median age of 50 years and 29 years respectively.

There were nine cases of TB meningitis in 2005, a rate of 0.2/100,000 population (2/million population). Between 1998 and 2005, a total of 50 cases of TB meningitis have been reported with four of the cases reported among 0-4 year olds.

There were 13 drug resistant cases notified in 2005, including two cases of multi-drug resistant TB (MDR-TB). One case of extensively-drug resistant TB (XDR-TB) was notified during 2005. This is the first XDR-TB case notified in Ireland. Multi-drug resistant cases and cases resistant to isoniazid represented 0.4% (2 cases) and 2.8% (13 cases) of total cases respectively. This compares to 0.5% and 3.5% respectively in 2004.

In recent years, the quality of the data, and in particular, data on treatment outcome, has improved greatly.

In 2005, information on treatment outcome was provided for 87.1% of cases which is an increase on the proportion in 2004 (84.3%). This compares to 84.8% in 2003, 77.2% in 2002 and 59.8% in 2001. It is of critical importance to TB control in Ireland that surveillance of TB and reporting of outcome data be maintained at a high level.

The Global Plan to Stop TB 2006-2015 was launched in January 2006 and aims to reduce the global prevalence of, and deaths due to TB by 50% in 2015 relative to 1990. In addition it proposes to eliminate TB as a public health problem (<1 case per million population) by 2050. This strategy calls on countries to strengthen health systems for TB treatment and control and to address MDR-TB, TB/HIV and other challenges e.g. high risk groups and areas where TB rates are high. The importance of good surveillance data cannot be underestimated in this context as they will help guide where resources should be directed in order to ensure effective control of TB in Ireland and in order to reach the elimination target by 2050.

Table 1: Summary of the epidemiology of TB in Ireland, 2005

Parameter	2005
Total number of cases	450
Crude notification rate per 100,000	10.6
Cases in indigenous population*	297
Cases in foreign-born persons*	152
Culture positive cases	283
Smear positive pulmonary cases	178
Mono-resistant to isoniazid	9
Multi-drug resistant cases	2
Extensively-drug resistant cases	1
Deaths attributable to TB	10
Outcomes reported in cases	392
TB meningitis cases	9

** Country of birth not reported for one case*

Provisional 2006 data
There were 458 cases of TB provisionally notified in 2006. It is important to note that these data are provisional and may change significantly following validation.

Of the 458 cases provisionally notified in 2006,

- Pulmonary TB was diagnosed in 296 cases (64.6%), extrapulmonary TB in 119 cases (26.0%) and pulmonary and extrapulmonary TB in 35 cases (7.6%).
- Of the 331 cases with a pulmonary disease component, 163 (49.2%) were culture positive and 131 (39.6%) were smear positive.
- There were six cases of TB meningitis provisionally notified corresponding to a rate of 0.1/100,000 population (1/million population).
- There were 288 cases born in Ireland and 151 were foreign-born. Country of birth was not reported for 19 cases.
- There were 273 cases (59.6%) notified in males, 183 cases (40.0%) in females and the mean age of cases was 42.7 years (range 0 to 93 years).
- Resistance was reported in 12 cases, four were mono-resistant to isoniazid and three were MDR-TB.

A more detailed report is available at www.hpsc.ie, under the disease name in Topics A-Z.

03

Infectious Intestinal Diseases

3.1 Campylobacter

Summary

Number of cases in 2006: 1815
Number of cases in 2005: 1801
Crude incidence rate: 43/100,000

Campylobacter is the commonest bacterial cause of gastroenteritis in Ireland. In 2006, 1815 cases of Campylobacter infection were notified (42.8/100,000 population), which was over four times the number of salmonellosis cases reported in 2006. This represented an increase on previous years (1801 and 1710 cases reported in 2005 and 2004 respectively) and was the highest rate reported in Ireland since 1999. An upward trend in the rate of campylobacteriosis has been seen in Ireland since 2001 (Table 1).

Campylobacter became a notifiable disease in Ireland in 2004. Prior to this, data on laboratory-confirmed cases of Campylobacter infection in humans were collected nationally as part of the EU Zoonoses Regulations. In terms of regional distribution, in 2006, the highest incidence was reported from the HSE-W region (50.1) followed by the HSE-M region (49.4). The lowest rate was reported from the HSE-NE region (30.8) (figure 2). Campylobacter has a well documented seasonal distribution with a peak in cases seen every year in early summer. In 2006, a rise in cases was observed from week 21 to week 26. This was not as definite a peak as seen in previous years, when a sharp peak was noted in week 26 (figure 1).

In 2006, the highest burden of illness was seen in children less than five years of age, with 22 % of cases occurring in this age-category (An age-specific incidence rate of 134 cases/100,000 was reported in the 0-4 age –group). This was also noted in previous years and is a well-reported feature of campylobacteriosis.

Another interesting feature of this pathogen is the gender distribution. This was reflected again in 2006 when looking at age-gender adjusted rates, there was a predominance of male cases in every age category (except 25-34 age group). Overall males accounted for 55.2% of all cases; females 44.4% (unknown 0.4%). There is currently no reference laboratory for human Campylobacter in Ireland so routine typing is not

Table 1. Annual number of cases of campylobacteriosis in Ireland, 1999-2006

Year	Number of cases	Crude incidence rate (95% CI)
1999	2085	57.5 [55.0 – 60.0]
2000	1613	41.2 [39.2 – 43.2]
2001	1286	32.8 [31.0 – 34.6]
2002	1336	34.1 [32.3 – 35.9]
2003	1568	40.0 [38.0 – 42.0]
2004*	1710	40.3 [38.4 - 42.2]
2005*	1801	42.5 [40.5 - 44.4]
2006*	1815	42.8 [40.8 - 44.8]

**rates based on 2006 Census data*

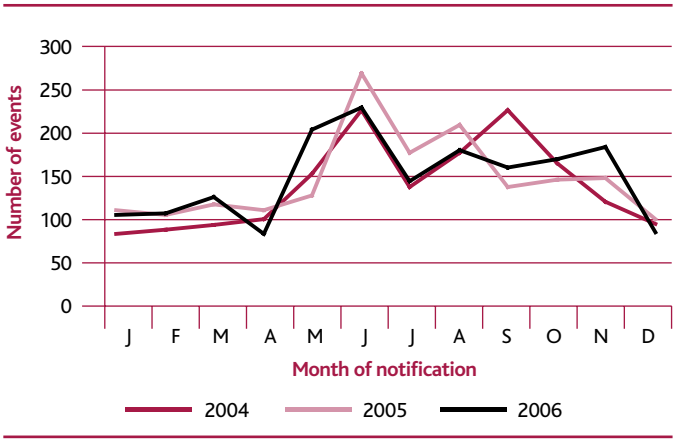

Figure 1. Seasonal distribution of Campylobacteriosis in Ireland, 2004-2006

carried out on isolates. Information on species type was available for just 38% (692/1815) of isolates. Of these, 629 (91%) were reported *as C. jejuni*; 58 (8%) as *C. coli;* 3 cases as *C. lari*, and one case each of *C. laridis* and *C. fetus*.

There were eleven family outbreaks of campylo-bacteriosis notified resulting in 25 cases of illness in 2006. These were all small clusters of illness with no more than three people reported ill in any outbreak.

Information on country of infection was only provided in 12% (218/1815) of cases. Of these, the majority were reported to have been acquired within Ireland, with just 9% associated with foreign travel. Spain and India were the most commonly reported countries (4 cases each). This is obviously a complete underestimate of the true burden of travel-associated cases.

The European network Enter-net has been routinely collecting data on Campylobacter infection since 2005 and Ireland has been contributing data on a quarterly basis since then. Quarterly and annual reports are produced by Enter-net and are available at http://www.hpa.org.uk/hpa/inter/enter-net_reports.htm

A major international conference on Campylobacter and Related Organisms, 'CHRO', was held in September 2007 in the Netherlands, presenting up to date research on Campylobacter in the areas of epidemiology and typing, genomics and pathogenesis, and risk assessment and control. See http://www.chro2007.nl/ _for more details.

A more detailed report is available at www.hpsc.ie, under the disease name in Topics A-Z.

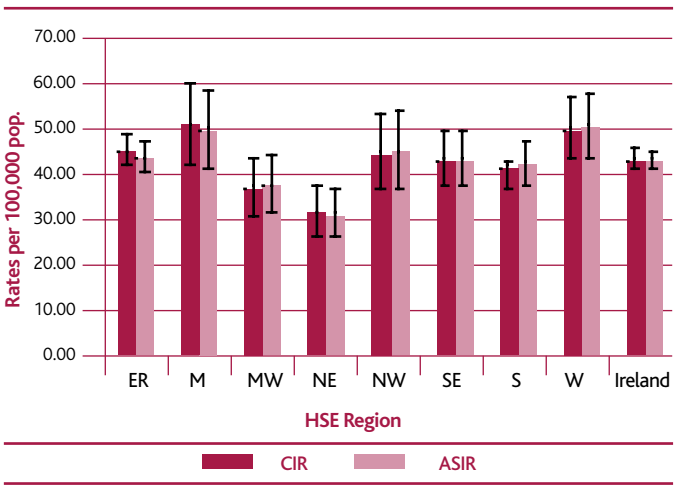

Figure 2. Age standardised incidence rates (ASIR) of human campylobacteriosis in Ireland, compared to crude incidence rates (CIR) in each HSE Region, 2006.

3.2 Cryptosporidiosis

Summary

Number of cases, 2006:367
Number of cases, 2005: 568
Crude incidence rate, 2006: 8.7/100,000

In 2006, 367 cases of cryptosporidiosis were notified in Ireland, a crude incidence rate of 8.7 per 100,000 population (table 1). This was a 36% decrease on the number of cases notified in 2005, and was the lowest annual number of cases since the disease became notifiable in 2004.

The crude incidence (CIR) and age standardised incidence (ASIR) rates by HSE area for 2006 are reported in table 1. As in 2004 and 2005, the HSE E reported the lowest crude incidence rate. Compared to 2005, there was a decrease in the incidence of cryptosporidiosis in six of the eight HSE-areas; in particular, the incidence rates in the NE and W were only about half that recorded in 2005, decreasing to around the same levels as were reported in 2004.

Table 1. Number of notified cases, crude incidence rate and age-standardised incidence rate cryptosporidiosis by HSE area, 2006, and annual number of cryptosporidiosis notifications and crude incidence rate, Ireland 2004-2005

HSE area	Number of notifications	CIR (95% CI)*	ASIR (95% CI)*
ER	7	0.5 (0.1-0.8)	0.5 (0.1-0.8)
M	39	15.5 (10.6-20.4)	14.4 (9.9-18.9)
MW	56	15.5 (11.5-19.6)	15.7 (11.6-19.8)
NE	28	7.1 (4.5-9.8)	6.5 (4.1-9.0)
NW	30	12.7 (8.1-17.2)	12.5 (8.0-17.0)
SE	61	13.2 (9.9-16.6)	13.3 (9.9-16.6)
S	74	11.9 (9.2-14.6)	12.2 (9.4-15.0)
W	72	17.4 (13.4-21.4)	17.9 (13.8-22.0)
Total 2006	**367**	**8.7 (7.8-9.5)**	-
Total 2005	**568**	**13.4 (12.3-14.5)**	-
Total 2004	**431**	**10.2 (9.2-11.1)**	-

**Rates calculations based on CSO census 2006, and may differ from rate published previously based on 2002 census*

Disease incidence peaked in quarter 2, with 52% of cases notified during the three months April to June (figure 1). The trend in 2006 mirrored closely the seasonal distribution of cases in 2004.

This contrasts strongly with the seasonal distribution of cases reported in the United Kingdom, Sweden and Germany, where the highest number of cases occurred in autumn, and with Spain, where the seasonal peak in 2005 occurred in June [Semenza and Nichols (2007)]. This suggests that the epidemiology of cryptosporidiosis in Ireland differs from the current epidemiology of cryptosporidiosis in these countries.

Typically, the highest reported incidence rates are in children under five years, and this year, the trend was similar. Overall, there were more males (n=198) than females (n=169) reported.

Eight outbreaks of cryptosporidiosis were reported in 2006: three general outbreaks and five family outbreaks (table 2). Sixty people were reported ill as a result of these outbreaks. The suspected mode of transmission for three outbreaks was person-to-person, and for four

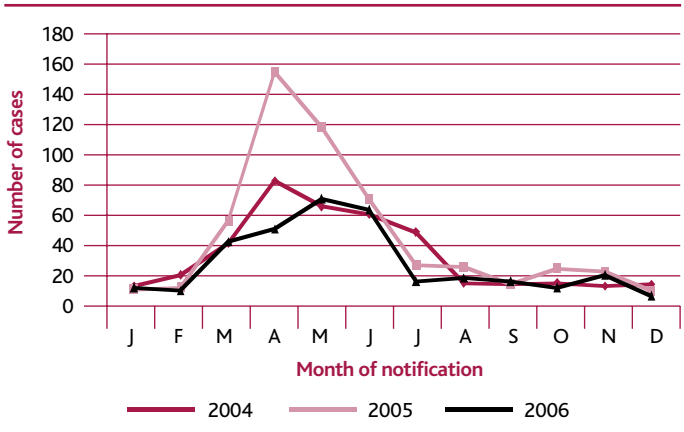

Figure 1. Seasonal distribution of cryptosporidiosis cases 2004-2006

outbreaks, water was suspected to have played a role in transmission (recreational water for two family outbreaks and drinking water for two general outbreaks). One family outbreak was associated with foreign travel.

For the general drinking water-associated outbreak in the SE, the water supply was a public supply and a boil water notice was issued. This supply has a ground water source and had on risk assessment been found to have a moderate risk for *Cryptosporidium*. Following identification of the outbreak, additional source protection measures were put in place and a UV treatment unit was commissioned, which resulted in the *Cryptosporidium* risk being reduced to 'low' after these measures were implemented. Speciation of human isolates was undertaken for this outbreak, which was reported to be due to *C. parvum* (Waterford Co Co. and HSE-IRT 2007).

Drinking water is an important transmission route in outbreaks of *Cryptosporidium*. In a review carried out by the EPA in 2005 of 363 *Cryptosporidium* risk assessments carried out on public water supplies in Ireland, it was reported that, at that time, 8% of supplies were in the high-risk category and 13% in the very high-risk category for *Cryptosporidium* (EPA 2005). Recreational water may have played a role in two family outbreaks reported in 2006. The role of recreational water in the transmission of cryptosporidiosis has been highlighted recently in the United Kingdom (Jones et al 2006, Smith et al 2006).

A more detailed report is available at www.hpsc.ie, under the disease name in Topics A-Z.

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Table 2. Cryptosporidiosis outbreaks Ireland 2006

Month	HSE area	Transmission route*	Location	Type	Number ill	Number hospitalised
Mar	S	Not specified	Community	General	10	-
May	SE	Person-person	Private House	Family	2	1
Jul	S	P-P/WB	Private House	Family	2	-
Jul	S	FB/WB	Other	General	28	-
Sep	NE	Person-person	Private House	Family	2	1
Oct	NE	Person-person	Private House	Family	2	0
Oct	W	Waterborne	Travel-related	Family	6	-
Nov	SE	Waterborne	Community	General	8	1

** P-P denotes person-to-person transmission; WB denotes waterborne transmission, FB denotes foodborne transmission*

3.3 Verotoxigenic *E. coli*

Summary

Number of cases, 2006: 158
Number of cases, 2005: 125
Crude incidence rate, 2006: 3.7/100,000

In 2006, 153 confirmed and five probable cases of VTEC were notified to HPSC, a crude incidence rate (CIR) of 3.7 per 100,000 (table 1). This is the highest annual total of VTEC infections reported since surveillance began in 1999, and represents a 26% increase on the number of cases reported in 2005.

As in previous years, the most common serogroup reported was VTEC O157 (n=123), followed by VTEC O26 (n=31), VTEC O103 (n=2), VTEC O113 (n=1) and VTEC O115 (n=1). Three of the VTEC O157 cases were co-infected with non-O157 strains. Although not notifiable, an additional four (HUS) cases were reported as suspected VTEC cases.

The increase in notifications in 2006 was strongly influenced by the increased number of non-O157 infections reported compared to 2005 (35 vs. 17 cases). Since surveillance for non-O157 cases began in 2003, there has been a steady increase in the reported incidence of non-O157 infection, which almost certainly reflects increased awareness and improved diagnosis nationally of non-O157 infections.

For the second year running, infections due to sorbitol-fermenting VTEC O157 were reported. There were two confirmed cases and an epidemiologically-linked HUS case from whom no VTEC was isolated. Typically, most VTEC O157 are unable to ferment sorbitol, and it is this feature that facilitates their identification. A number of human infections due to these atypical sorbitol-fermenting VTEC O157 strains were also reported in the United Kingdom in 2006.

Three VTEC cases this year had mixed O157/non-O157 infections. One was a mixed O157/O8 infection, one a mixed O157 with two different ungroupable *E. coli* strains, and the third was a mixed O157/O26 infection.

Regional variation was noted in the numbers of cases reported (table 2), with the highest incidence rates for VTEC overall in the HSE-W, HSE-M, HSE-MW and HSE-

Table 1. Number and crude incidence rates confirmed and probable VTEC and VTEC O157 infection, Ireland 2001-2006

Year	Number VTEC O157	CIR VTEC O157* (95% CI)	Number VTEC ǂ	CIR VTEC* (95% CI)
2001	52	1.3 (0.9-1.6)	N/A	N/A
2002	70	1.7 (1.3-2.2)	N/A	N/A
2003	88	2.2 (1.8-2.7)	95	2.4 (1.9-2.9)
2004	52	1.2 (0.9-1.6)	61	1.4 (1.1-1.8)
2005	108	2.6 (2.1-3.0)	125	3.0 (2.4-3.5)
2006	123[$]	2.9 (2.4-3.4)	158[‖]	3.7 (3.2-4.3)

** Data from the 2002 census were used to calculate rates in 2001-2003 and from 2006 census in 2004-2006*
ǂ Includes serogroup O157
[$]For simplicity, the 3 mixed infections are included in the rates calculated for VTEC O157 infections. Includes 119 confirmed and four probable cases
[‖]Includes one probable non-O157 case and the four probable VTEC O157 cases

NE. The serogroup distribution in the NW was strikingly different from other areas this year, in that VTEC O26 was the only serogroup reported. VTEC O157 was consistently the most common VTEC reported in all other areas, although the HSE-W also reported a significant number of VTEC O26 cases in 2006 (table 2).

The highest number of confirmed and probable cases was reported in quarter 3 (table 2), although as in 2005, relatively high numbers of cases were also reported in quarter 4, in particular in October.

Disease incidence was highest among young children (mean age=19 years, median age =7.5 years), which is consistent with previous years, and there were similar numbers of male (n=81) and female (n=76) cases; for one case sex was unknown. In contrast to previous years, the age distribution of non-O157 cases more closely matched that for VTEC O157 cases, possibly reflecting improved awareness and diagnosis of non-O157 infections among adult patients.

Information on symptoms was available for 151 notified cases, of whom 109 (72%) were reported as symptomatic. Reported symptoms included bloody diarrhoea in 58 cases, and haemolytic ureamic syndrome (HUS) in 17 cases. HUS cases ranged in age from one to 76 years, and as expected, a higher proportion of paediatric (14/95) than adult (3/63) cases developed HUS. Notably, three HUS cases were associated with non-O157 VTEC (one confirmed O103, one confirmed O26 and one probable O26 case), and there was one case with a mixed O157/non-O157 infection.

For the 4 suspected VTEC cases (i.e. HUS of possible infective aetiology where no laboratory evidence of VTEC was uncovered), the age range was 10 months to 7 years.

In 2006, 118 VTEC O157 isolates were referred to the HSE PHL Dublin Mid Leinster, Cherry Orchard Hospital (table 3). As in previous years, PT32 was the commonest phage type reported (n=56), accounting for 47% of the VTEC O157 reported. The second most common phage type this year was PT21/28.

The verotoxin profiles of VTEC strains were typical. Eighty-seven per cent of VTEC O157 strains carried the

Table 2. Number of confirmed VTEC cases by quarter and HSE area, crude incidence rate and age-standardised incidence rate by HSE area, Ireland 2006

Quarter	E	M	MW	NE	NW	SE	S	W	Total
Q1	2	0	0	0	1	1	0	2	**6**
Q2	8	9	4	2	3	0	2	11	**39**
Q3	11	8	10	15	5	2	5	10	**66**
Q4	9	1	7	4	0	6	8	12	**47**
VTEC O157	22	17	18	17	0	9	12	25	**120**
Non-O157 VTEC	7	1	3	3	9	0	2	10	**35**
Mixed O157/non-O157 infection	1	0	0	1	0	0	1	0	**3**
Total	**30**	**18**	**21**	**21**	**9**	**9**	**15**	**35**	**158**
CIR VTEC* (95% CI)	**2.0 (1.3-2.7)**	**7.2 (3.9-10.5)**	**5.8 (3.3-8.3)**	**5.3 (3.1-7.6)**	**3.8 (1.3-6.3)**	**2.0 (0.7-3.2)**	**2.4 (1.2-3.6)**	**8.5 (5.7-11.3)**	**3.7 (3.2-4.3)**

**Rates calculated using CSO census 2006*

genes for VT2 only while 13% carried the genes for both VT1 and VT2 (table 3). In contrast, 66% of non-O157 VTEC isolates carried the genes for VT1 only, 18% for VT2 only, and 16% VT1 and VT2.

Thirty VTEC outbreaks were reported this year, comprising 90 of the 158 confirmed and probable cases notified. Three outbreaks were described as general outbreaks and 27 as family outbreaks. Twenty-five were due to VTEC O157 and five due to VTEC O26. The suspected modes of transmission reported are listed in table 4.

Person-to-person spread is an important mode of VTEC transmission in households, child-care facilities and institutions, and was suspected to have played a role in nine VTEC outbreaks in 2006. The second most common suspected mode of transmission in 2006 was food (four outbreaks) although no foods were found positive for VTEC during investigations.

For one family outbreak and for one sporadic case in 2006, examination of water from the private wells of the affected households confirmed the presence of the *E. coli* O157 indistinguishable from the associated human isolates. Drinking water from untreated private water supplies remains an important risk factor for VTEC infection in Ireland.

Given the relatively high incidence of human VTEC infection in Ireland, a designated VTEC Reference laboratory which is adequately resourced is essential. Sophisticated molecular typing tools employed by the PHL at Cherry Orchard (such as pulsed field gel electrophoresis) are increasingly demonstrating their value in the investigation of outbreaks and clusters. Safe guarded resourcing of these essential elements of the service will ensure that the necessary surge capacity and responsiveness exists to effectively inform public health action during VTEC incidents.

A more detailed report is available at www.hpsc.ie, under the disease name in Topics A-Z.

Table 3. Verotoxin and phage typing results for VTEC isolates referred to the PHL HSE Dublin Mid Leinster, Cherry Orchard Hospital in 2006

Serogroup	PT	VT1 only	VT2 only	VT1 & VT2	Total
O157	2	0	1	0	1
	8	0	2	11	13
	14	0	3	0	3
	31	0	7	0	7
	32	0	52	4	56
	34	0	2	0	2
	51	0	3	0	3
	21/28	0	29	0	29
	RDNC	0	3	0	3
	N/K	0	1	0	1
O26	-	19	6	6	31
O ungroupable	-	1	1	0	2
O103	-	2	0	0	2
O113	-	1	0	0	1
O115	-	1	0	0	1
O8	-	1	0	0	1
Total	-	25	110	21	156

Note that for one case diagnosed by serodiagnosis, and five probable cases reported on the basis of epidemiological linkage, isolates were not available for typing. Table 3 includes all strains isolated from mixed VTEC infections.

Table 4. VTEC outbreaks in Ireland 2006 by suspected mode of transmission

Suspected mode of transmission*	Number of outbreaks	Number of confirmed cases	Number ill
Animal contact	1	3	3
Person-to-person	5	21	8
Waterborne	1	2	2
P-P and foodborne	3	9	7
Foodborne	1	2	1
P-P and waterborne	1	3	2
Unknown/Not specified	18	50	43
Total	30	92	68

**P-P denotes person-to-person transmission*

3.4 Hepatitis A

Summary

Number of cases in 2006: 39

Age-standardised incidence rate: 0.9/100,000 population

Number of cases in 2005: 56

Hepatitis A virus causes an acute, usually self-limiting disease of the liver. It is primarily transmitted from person to person via the faecal-oral route and is associated with poor hygiene and sanitation. Common source outbreaks due to contaminated food or water may also occur.

The incidence of hepatitis A in Ireland has been low in recent years and remained low in 2006, with 39 cases notified. This corresponds to an age-standardised notification rate of 0.9/100,000 population and represents a 30% decrease compared to 2005, when 56 cases were notified (figure 1). Case classification was reported for all cases, with 38 cases laboratory confirmed and one case classified as possible.

Fifty four percent of cases were male, 44% were female and sex was unknown for one case. All age groups were affected, but the highest rates were in children aged 0-9 years (figure 2). Seven patients were known to have travelled outside of Ireland within the incubation period of the disease.

Three family outbreaks were reported in 2006. One outbreak involving two family members and a separate outbreak affecting five extended family members were reported by the HSE-S. No food or water sources were identified. The remaining outbreak involved two siblings in the HSE-E and was related to travel to Pakistan.

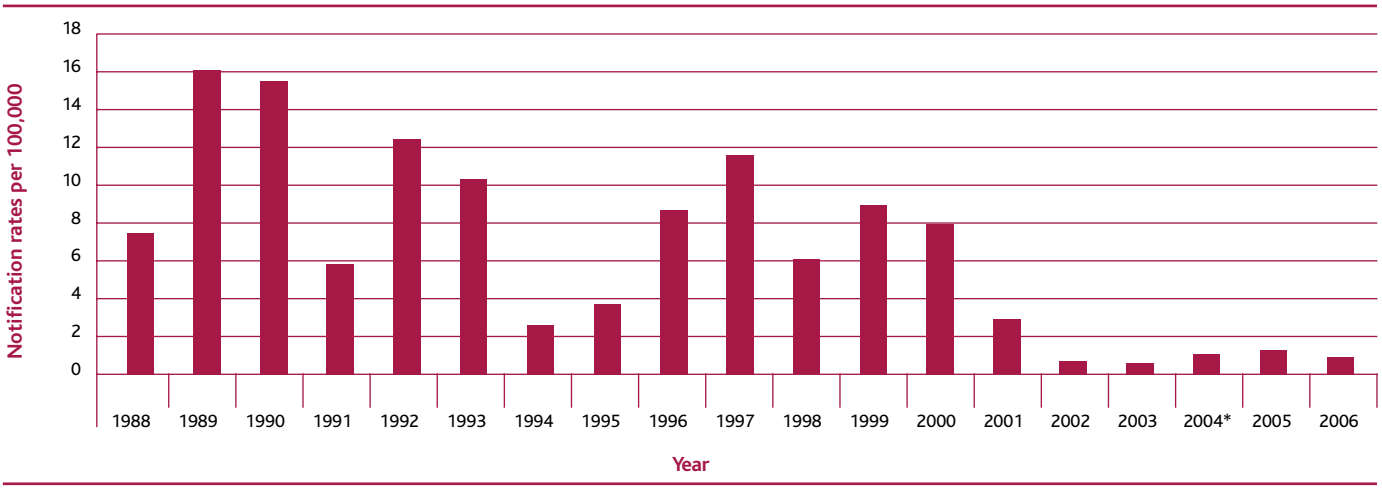

Figure 1. Crude notification rates/100,000 population for hepatitis A, 1988-2006
**Case definitions and mandatory laboratory reporting of notifiable infectious diseases were introduced in 2004*

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) System on 3rd September 2007. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

A more detailed report is available at www.hpsc.ie, under the disease name in Topics A-Z.

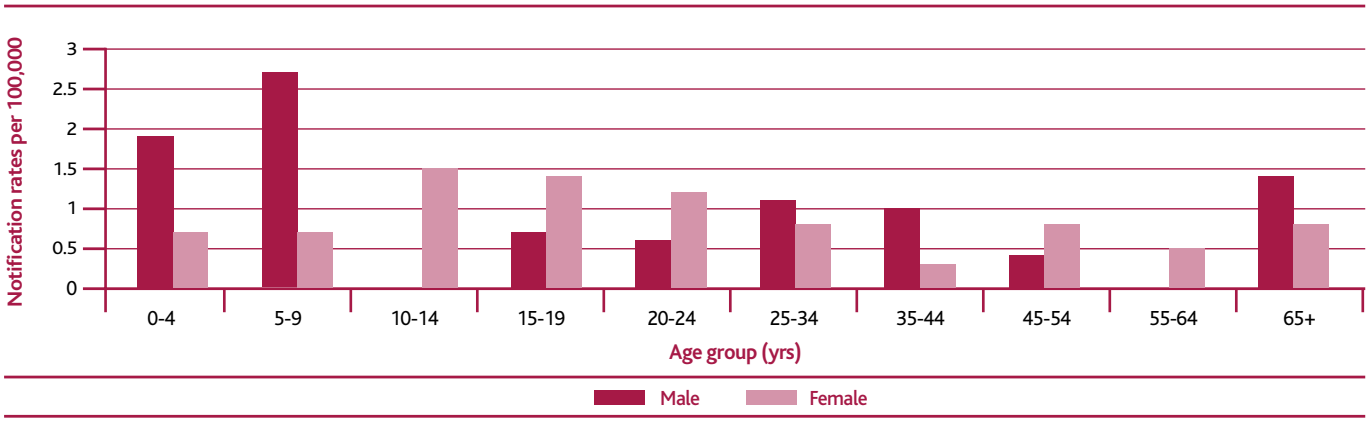

Figure 2. Age and sex-specific notification rates/100,000 population for hepatitis A, 2006

3.5 Rotavirus

Summary

Number of cases in 2006: 2112

Number of cases in 2005: 2251

Crude incidence rate: 50/100,000

Rotavirus is the commonest reported cause of acute gastroenteritis in children under five years of age in Ireland, as well as worldwide.

There were 2306 notifications of acute infectious gastroenteritis (AIG) in 2006. Rotavirus was the causative organism identified in 2112 (92%) of these, giving a crude incidence rate (CIR) of 50.0 cases per 100,000 population (table 1). This represented a decrease compared to 2005, when 2251 cases of rotavirus were notified (CIR 53.1 cases per 100,000).

Acute Infectious Gastroenteritis became a statutorily notifiable disease in 2004. Only cases of rotavirus and 'gastroenteritis unspecified' are notifiable under this disease category. Prior to 2004, rotavirus was only notifiable as a generic disease category of 'gastroenteritis in children less than two years of age'. Data for this report were extracted and analysed from the CIDR system.

Rotavirus is primarily a paediatric illness and when the distribution of cases by age group is examined for 2006, it is evident that the highest burden of illness is seen in children less than five years, as seen in previous years. The majority of infections (n=2026) occurred in children less than two years of age. There has been a continuous increase in the number of cases affecting this age group over recent years (figure 1). However, as rotavirus only became notifiable since 2004, it is possible that figures for previous years underestimate the true burden of infection and this should be borne in mind when analyzing these data.

Regional variation was observed in the number of cases reported (table 1), with the highest incidence rate reported from the HSE-NW region, and the lowest rate reported from the HSE-E region. Most regions noted a decrease in the rate of rotavirus infection compared to 2005, but an increase was seen in the HSE-NW and the HSE-S regions.

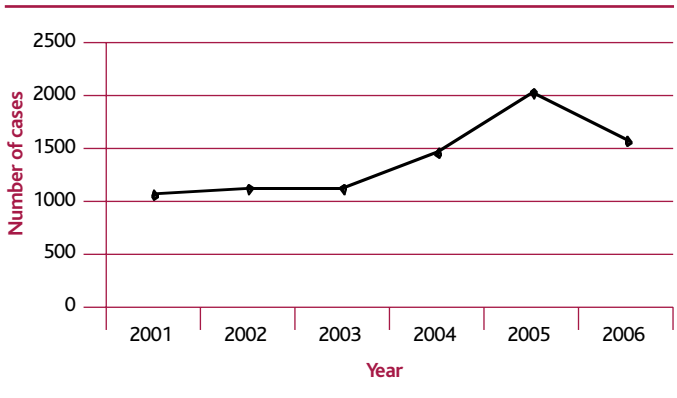

Figure 1: Number of cases of rotavirus in children less than two years of age by year, 2001 to 2006

Table 1: Number of notified cases, crude incidence rate and age-standardised incidence rate of rotavirus infections in Ireland by HSE area, 2006, and total number with crude incidence rate for 2004-2005.

HSE Area	No. of cases	*CIR incl. 95% C.I.	*ASIR incl. 95% C.I.
E	588	39.2 [36.0 - 42.4]	40.3 [37.0 - 43.5]
M	187	74.3 [63.7 - 85.0]	67.1 [57.4 - 76.7]
MW	96	26.6 [21.3 - 32.0]	26.8 [21.4 - 32.2]
NE	116	29.4 [24.1 - 34.8]	26.2 [21.4 - 30.9]
NW	203	85.6 [74.0 - 97.3]	84.3 [72.7 - 95.8]
SE	221	48.0 [41.6 - 54.2]	46.6 [40.5 - 52.7]
S	394	63.4 [57.1 - 70.0]	65.9 [59.4 - 72.4]
W	307	74.1 [66.0 - 82.3]	76.9 [68.3 - 85.4]
Total 2006	**2112**	***50.0 [48.0 - 52.0]**	
Total 2005	**2251**	***53.1 [50.9 – 55.3]**	
Total 2004	**1600**	***37.8 [35.9 – 39.6]**	

**Rates calculated using 2006 census data and may differ from previously published rates*

In terms of gender distribution, males accounted for 1068 cases (50.6%); females 1026 (48.6%), with 0.9% of cases unknown. This represented a ratio of males: females of 1.04:1. This was similar to previous years when a significant gender bias was not observed.

Rotaviral infection has a well documented seasonal pattern with peaks in cases occurring each year in later winter/ early spring. Analysis of the data by week of notification from 2004 to 2006 is shown in figure 2. In 2006, a peak was observed during week 17, which was the same week the 2005 peak occurred. (There is a 'false' second peak seen in 2005 during week 33, 2005 which is attributable to bulk uploading of notifications for the HSE-W region).

There were three rotavirus outbreaks notified in 2006, two general and one family. The general outbreaks occurred in a hospital and a residential institution and there were six people reported ill in each.

A major strategy for control of rotavirus disease is prevention through vaccination. Two rotavirus vaccines have been recently authorised for marketing in Europe (*Rotarix* and *Rotateq*). The United States have already introduced one of these vaccines (*Rotateq*) as part of their national childhood vaccination schedule, while the majority of European countries, including Ireland, are still considering this decision.

A more detailed report is available at www.hpsc.ie, under the disease name in Topics A-Z.

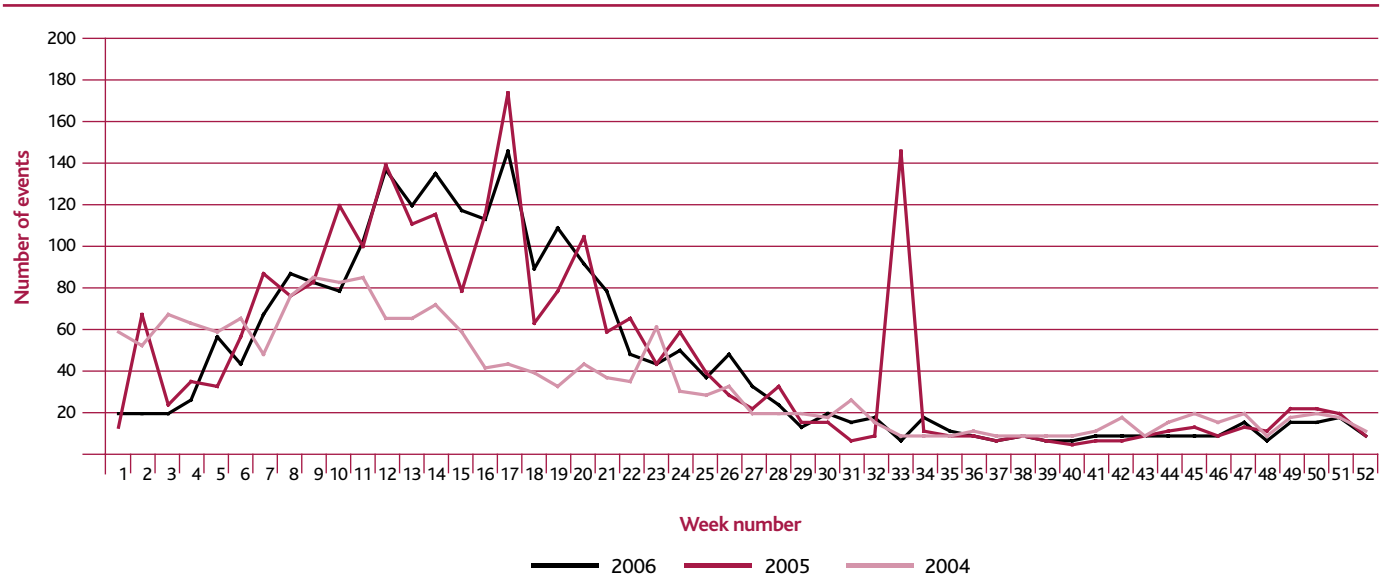

Figure 2: Seasonal distribution of rotavirus events by week, 2004-2006 (CIDR)

3.6 Salmonella

Summary

Number of cases in 2006 (CIDR): 422
Number of cases in 2005 (CIDR): 348
Number of isolates referred to NSRL (2006): 430
Crude incidence rate: 10.0/100,000

In 2006, 422 cases of salmonellosis were notified in Ireland. This was an increase on 2005 when there were 348 cases (fig 1). In 2006, 430 *Salmonella* isolates were referred to the National Salmonella Reference Laboratory (NSRL), which was also an increase on 2005.

The female: male ratio was 1.3:1. In terms of age distribution, the highest number of cases was seen in children under five years of age, with over 20% of cases occurring in this age category. It is likely that more specimens are submitted for testing from this age-group so this should be borne in mind when interpreting these data.

Analysis of the number of salmonellosis events notified to HPSC by week in 2006, revealed peaks in incidence from mid-August to early October. This is in line with previous years as seasonal peaks for salmonellosis are typically seen each year at this time.

Analysis of serotyping data from NSRL in 2006 revealed that there were 65 different serotypes identified by NSRL. As has been the trend in recent years, the predominant serotype causing human illness in 2006 was *S.* Enteritidis (n=158), followed by *S.* Typhimurium (n=101). After *S.* Enteritidis and *S.* Typhimurium, the next most commonly isolated serotypes were *S.* Hadar (n=11), *S.* Infantis (n=11) and *S.* Virchow (n=10) (Table 1). There were seven cases of *S.* Typhi and one isolate of *S.* Paratyphi A detected in 2006.

In terms of phage typing, the commonest phage type of *S.* Typhimurium reported in 2006 was DT104b (30%), followed by DT104 (25%). This was a change from 2005 when DT104b was the commonest type detected. PT 4 was the commonest phage type of *S.* Enteritidis detected in 2006 (21%). This represented a change in trend as from 2004 there had been a decrease in PT4 and non-PT4 types were more common. However in 2006, PT4 emerged again as the commonest. This was quite a notable increase, as PT4 was responsible for just 13% of S.E. phage types in 2005.

Ninety two out of 430 isolates (21%) reported to NSRL in 2006 were found to be associated with travel outside of Ireland. The most commonly reported countries were Spain (n=17), India (6), Turkey (6), Croatia (5), Portugal

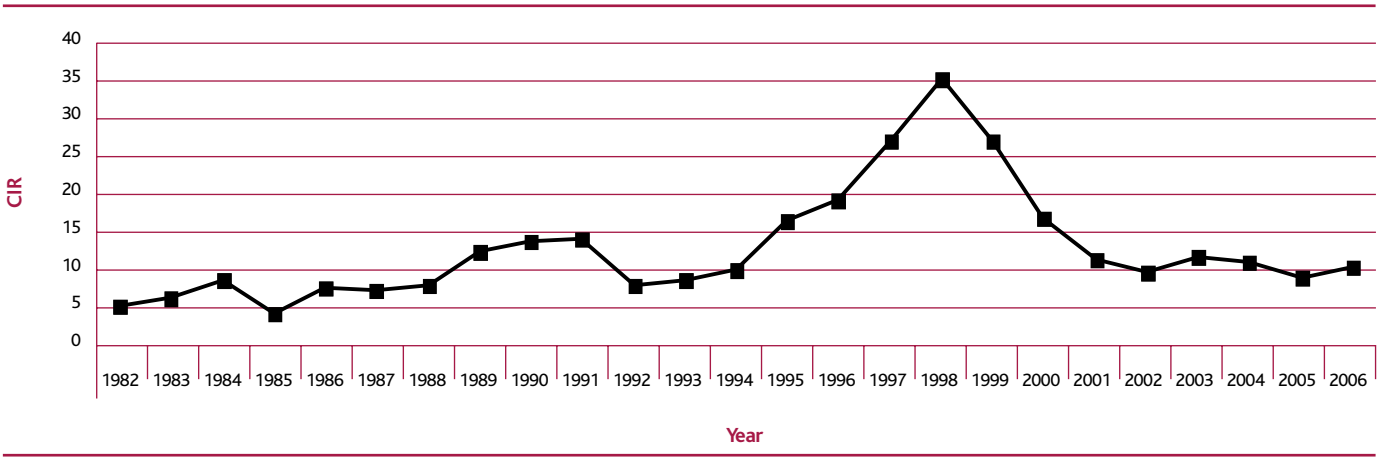

Figure 1. Crude rate of Salmonellosis in Ireland per 100,000 population, 1982-2006
CIR, crude incidence rate per 100,000 population

(5), Tunisia (4) and Bulgaria (4). This is undoubtedly an underestimate as foreign history travel of patients is not always reported.

In 2006, there were 20 outbreaks of *S. enterica* notified to HPSC; five general and 15 family outbreaks. All of these were small outbreaks, with no more than five persons reported ill in any outbreak. Eleven of the outbreaks were reported to have been associated with travel outside of Ireland. Of the general outbreaks, one was associated with a crèche and four were travel-associated.

An interesting development in terms of typing of Salmonella strains was that in 2006, the NSRL launched a new molecular method for the analysis of *S.* Typhimurium DT104. PFGE has been shown to be of very limited value in subdividing DT104 isolates into smaller groups. The new method 'multiple-locus variable number tandem-repeat analysis', often referred to as MLVA is based on repetitive DNA sequences called variable number of tandem repeats (VNTR). Initial results from NSRL are very promising and this method should enhance the surveillance and outbreak detection of *Salmonella* Typhimurium in Ireland.

The array of typing methods now being performed by the NSRL continues to be an extremely discriminatory tool for cluster/ outbreak detection especially for our commonest serovars, *S.* Enteritidis and *S.* Typhimurium.

A more detailed report is available at www.hpsc.ie, under the disease name in Topics A-Z.

Table 1 Salmonella serotype distribution 2005-2006 (NSRL)

	2006		2005	
Rank	**Serotype**	**No. (%)**	**Serotype**	**No. (%)**
1	Enteritidis	158 (37%)	Enteritidis	145 (41%)
2	Typhimurium	101 (23%)	Typhimurium	85 (24%)
3	Hadar	11 (3%)	Agona	10 (3%)
4	Infantis	11 (3%)	Virchow	9 (3%)
5	Virchow	10 (2%)	Hadar	8 (2%)
6	Newport	9 (2%)	Goldcoast	7 (2%)
7	Saintpaul	8 (2%)	Java	7 (2%)
8	Typhi	7 (2%)	Stanley	6 (2%)
9	Bredeney	6 (1%)	Dublin	5 (1%)
10	Stanley	6 (1%)	Newport	5 (1%)
	Others	103 (24%)	Others	70 (19%)
Total		**430 (100%)**		**357 (100%)**

3.7 Less common gastrointestinal infections

Listeriosis

Seven cases of listeriosis were notified in 2006 compared to 12 in 2005 and 11 in 2004 (table 1).

There was one pregnancy-related case and an associated neonatal case.

There were four adult cases, all of which were reported either as elderly (≥65 years) or as suffering from an underlying illness that predisposed them to listeriosis. There were 3 males, one female, and ages ranged from 50 to 87 years of age. Clinical presentations included septicemia (n=2) and meningitis (n=1); no clinical information was provided for the remaining adult case.

No information on risk factors was available for the seventh case.

There were two deaths in 2006 due to listeriosis, one neonatal and one adult.

Listeriosis remains a hazard for the elderly, persons with underlying illness, and other vulnerable groups such as pregnant women and neonates.

Giardiasis

In 2006, there were 65 cases of giardiasis notified, a slight increase on the number notified in 2005 (n=57) and in 2004 (n=53), when the disease first became notifiable.

Cases ranges in age from 1-84 years (mean age=26 years, median age=28 years), with approximately equal numbers of males (n=33) and females (n=31); sex unknown for one case.

Five cases were reported associated with foreign travel: the countries of infection reported were Nepal, Niger, Liberia, Nigeria and Kenya. Two cases were reported as being acquired in Ireland, and for the remaining 58 cases, country of infection was unknown or not specified.

In 2006, there was one small family outbreak reported with two persons ill. The mode of transmission was reported as unknown.

Table 1. Listeriosis notifications by case type, Ireland 2004-2006

	2004	2005	2006
Adult or juvenile	8	12	4
Pregnancy-related	3	0	1
Neonatal	0	0	1
Unknown	0	0	1
Total	**11**	**12**	**7**

Shigellosis

Fifty-four cases of shigellosis were notified in 2006 compared to 36 in 2005 and 56 in 2004.

Cases ranges in age from one to 66 years (mean age=25 years, median age=28 years), with approximately equal numbers of males (n=26) and females (n=28).

As in previous years, *Shigella sonnei* was the most common species reported (n=27). There were also 16 *S. flexneri*, one *S. boydii*, and 10 cases for which the species was not reported.

Twelve cases (22%) were reported associated with foreign travel: the countries of infection reported were India (n=3), Morocco (n=3), and there was one case associated with travel to each of Botswana, South Africa, Mexico, Thailand, Tunisia and Pakistan. Seven cases were reported as being acquired in Ireland, and for the remaining 35 cases, country of infection was unknown or not specified.

During 2006, three small outbreaks were notified: two family outbreaks and one general outbreak. In total, there were 12 cases ill between the three outbreaks. The mode of transmission was reported as person-to-person spread in two outbreaks, and as unknown for the third outbreak.

In the last decade, the number of cases of shigellosis has remained low in comparison to the number of cases notified in the early 1990s (figure 1).

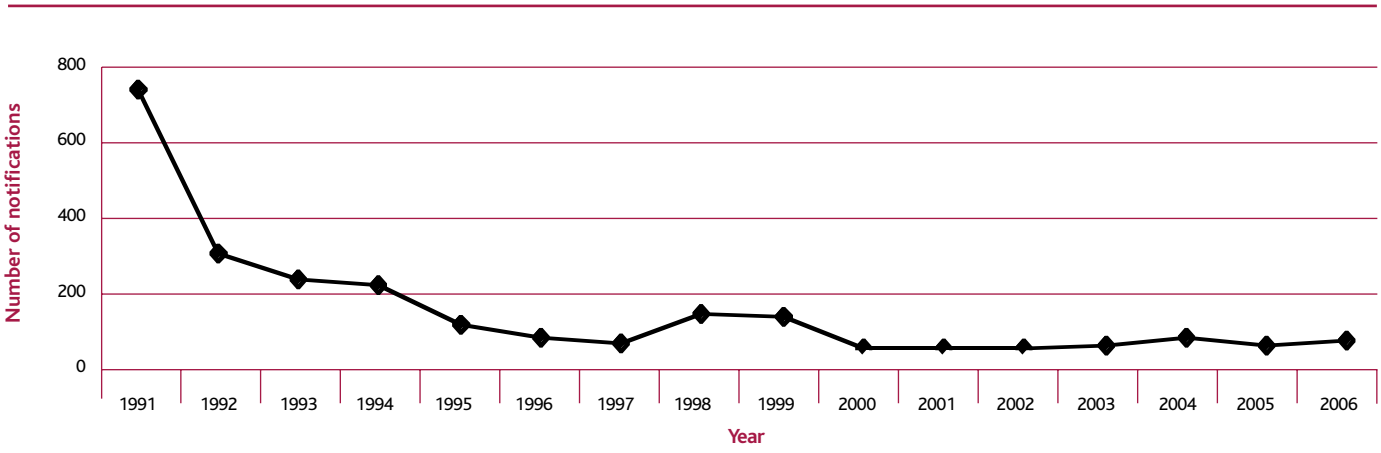

Figure 1. Annual number shigellosis notifications, Ireland 1991-2006

04

Vectorborne and Zoonotic Diseases

4.1 Non-IID Zoonotic Diseases

Leptospirosis

Twenty cases of leptospirosis were notified in 2006, 33% more than were reported in the years 2004 and 2005 (figure 1). All cases this year were male and were aged between 19 and 67 years (mean age, 35 years; median age, 35 years). Ten required hospitalization, one was treated as a hospital out-patient, three were reported as GP patients, and patient type was not available for the remaining six patients. Half of all cases (n=10) were notified in the last quarter of the year.

Four cases were believed to have acquired their illness occupationally, through farming activities. Nine cases reported recent contact with river water, five through canoeing, two through freshwater swimming, one through a river rescue course and one while performing a river rescue. Two cases were associated with foreign travel, the country of infection for both being Thailand. Leptospirosis has been associated with flood conditions, and in the autumn of 2006, Thailand experienced severe flooding. No risk factor information was available for the remaining five cases.

Four cases in 2006 were infected with *Leptospira interrogans hardjo*, including three of the four farming-related cases. One river water-associated case was reported as *Leptospira interrogans icterohaemorrhagiae*, and species was not reported for the remaining 15 cases.

Activities that have been associated with leptospirosis risk include farming, occupations that involve contact with wet rodent-infested environments, recreational activities such as water sports, and flooding. Many countries have reported a change in leptospirosis epidemiology in recent years, with an increasing proportion of cases related to recreational rather than occupational exposures. The variety of possible transmission routes reported here and elsewhere serve as reminders to clinicians to consider leptospirosis when compatible symptoms are observed, not only for patients in occupational groups historically considered at risk.

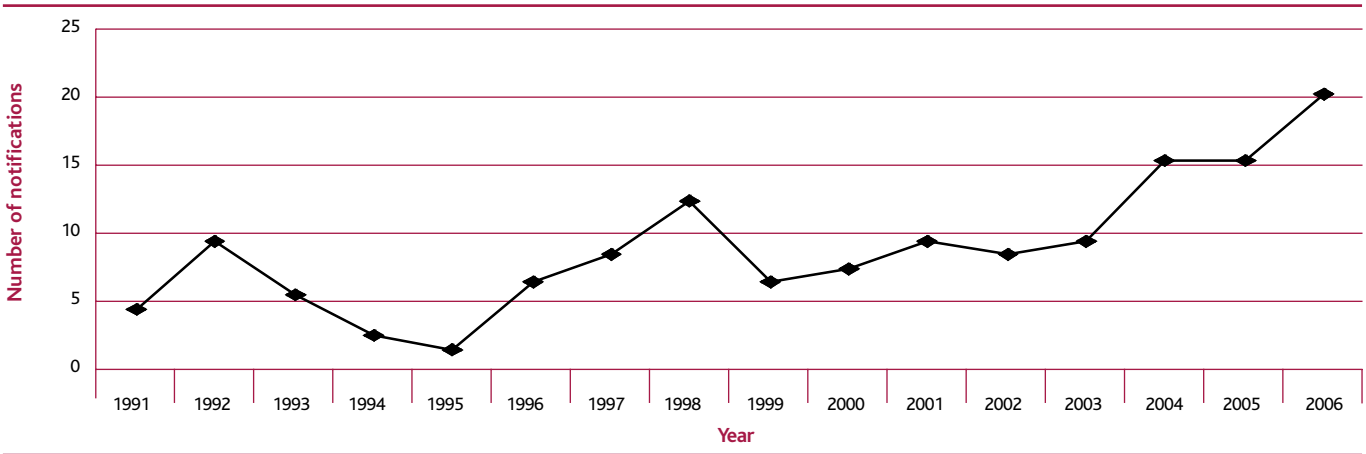

Figure 1. Annual number of leptospirosis notifications, Ireland 1991-2006 (data source: CIDR)

Toxoplasmosis

During 2006, 44 cases of toxoplasmosis were notified compared to 47 in 2005 and 33 in 2004.

Seven cases were reported as congenital cases. Congenital cases are identified through a pilot toxoplasmosis screening program which commenced in July 2005, and is coordinated at the Rotunda Hospital in conjunction with the National Newborn Screening Laboratory.

The remaining 37 cases ranged in age from four years to 78 years (mean age, 34 years; median, 32 years) (table 1). Of the 44 cases, 34 were female and 10 were male. The high number of cases reported among women of child-bearing age may reflect enhanced testing during pregnancy.

Brucellosis

During 2006, 29 cases of brucellosis were notified compared to 53 in 2005 and 60 notifications in 2004.

Twenty-seven cases (93%) were male while two (7%) were female. The cases ranged in aged from 9 years to 84 years (mean age, 55 years; median age, 58 years) (table 2). The age and sex distribution for brucellosis in recent years in Ireland suggests that occupational exposure is likely to be the main transmission route for this disease.

In 2006, four cases were reported as confirmed, and 25 as were classified as probable. It is important to bear in mind that notifications classified as probable may be a reflection of past infection rather than acute infection as many of the laboratory notifications were based on an isolated high titre result. Specifically in 2006, 17 of the 25 probable cases were reported as chronic cases; acute/chronic status was not specified for seven of the remaining probable cases.

Table 1. Toxoplasmosis notifications by age and sex, Ireland 2006

Age group	Male	Female	Total
<1 yr	3	4	**7**
1-4 yrs	0	1	**1**
5-14 yrs	0	0	**0**
15-24 yrs	2	4	**6**
25-44 yrs	3	19	**22**
45-64 yrs	2	5	**7**
65+ yrs	0	1	**1**
Total	**10**	**34**	**44**

Table 2. Brucellosis notifications by age and sex, Ireland 2006

Age group	Male	Female	Total
<5 yr	0	0	**0**
5-14 yrs	1	0	**1**
15-24 yrs	0	0	**0**
25-44 yrs	5	1	**6**
45-64 yrs	15	1	**16**
65+ yrs	6	0	**6**
Total	**27**	**2**	**29**

Q Fever

Twelve cases of Q fever were notified during 2006 compared to ten in 2005 and seven in 2004.

Nine cases occurred in males and three in females. The cases ranged in age from three years to 77 years (mean age, 47 years; median age, 43 years) (table 3).

Eight cases were classified as confirmed and four as probable.

Table 3. Q fever notifications by age and sex, Ireland 2006

Age group	Male	Female	Total
<5 yr	1	0	**1**
5-14 yrs	0	0	**0**
15-24 yrs	0	0	**0**
25-44 yrs	4	1	**5**
45-64 yrs	2	0	**2**
65+ yrs	2	2	**4**
Total	**9**	**3**	**12**

4.2 Malaria

Summary

Number of cases, 2006: 96
Number of cases, 2005: 44
Crude incidence rate, 2006: 2.3/100,000

In 2006, 96 cases of malaria were notified (figure 1). This is an increase of 118% on the number reported in 2005, and equates to a crude annual incidence rate of 2.3 per 100,000 (95% C.I. 1.8-2.8).

Cases ranged in age from 10 months to 63 years, and male cases (n=58) were more common than female cases (n=36); for two cases, sex was unknown/ unspecified. Notably, there were 26 paediatric cases (27%) and 39 males (41% of all cases) in the 20-44 years age range.

Almost half of all cases were reported by the HSE-E (n=45), while 17 cases were reported from the HSE-NE. There were also nine cases in the HSE-S, seven in the HSE-W, six in the HSE-NW, five in the HSE-M, four in the HSE-SE and three in the HSE-MW.

Data received on organism has improved with species data reported for 95% of cases in 2006. As in previous years, the most common species reported was *Plasmodium falciparum*, accounting for 83% of all cases notified (n=80). There were also four *P. vivax*, six *P. ovale*, one *P. malariae* and five cases where the species was not specified. This is similar to the species distribution reported by the United Kingdom and in Europe for cases of imported malaria.

Information on patient type was available for half of patients (n=48), with 44 cases reported as hospital in-patients, one as a hospital out-patient, two as GP patients, and one as patient type=other. No deaths due to malaria were reported in 2006.

There were no cases of airport, congenital, induced or introduced malaria reported. Country of infection was recorded for 76 cases, the majority of whom were exposed in sub-Saharan Africa; a small but increasing number of cases were associated with exposure in Asia (table 1).

Reason for travel was recorded for 73 cases. The largest subgroup identified in 2006 was people who had travelled to visit family in their country of origin-over

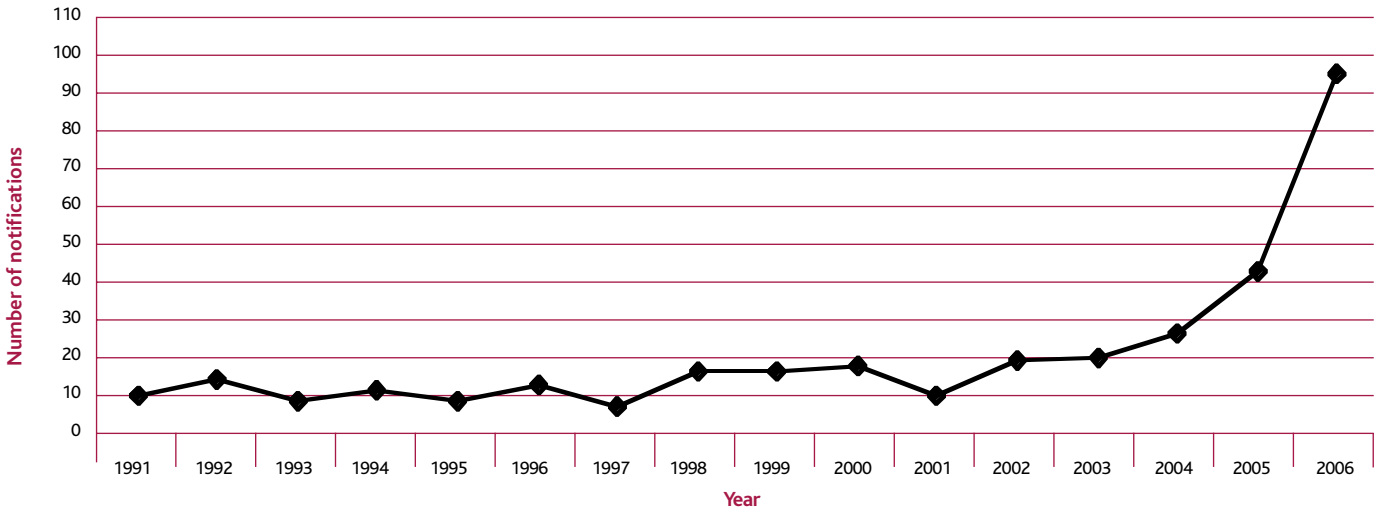

Figure 1. Number of malaria notifications, Ireland 1982-2006

half of those for whom the information was available (n=40). The second most common reason reported for travel was holidays (n=13). This is an increase on the number of holidaymakers reported in the last two years (one in each year). New entrants made up a further 12 cases, with the remainder reported as business travellers (n=1), armed services (n=2), Irish citizen living abroad (n=1), foreign visitor ill while in Ireland (n=1), other (n=3) and not specified (n=23).

Of the 40 cases whose reason for travel was reported as 'visiting family in country of origin', 11 were born in Ireland and all 11 were less than 10 years of age, presumably representing the children of immigrants. In comparison to their parents who may retain some immunity from previous exposure (although this fades when they no longer live in endemic areas), these children are likely to be more susceptible.

Excluding new entrants (those who had spent their lives to date living in an endemic region would not be expected to be taking chemoprophylaxis), information on malaria prophylaxis was available for 57 of the remaining 84 cases. Of these, 43 took no prophylaxis, and 12 took prophylaxis but failed to continue for the required period. Only two cases reported full compliance with prescribed course of prophylaxis.

With increasing holiday travel to malarious destinations, and a growing immigrant community who regularly travel home, it is now becoming more likely that malarial patients will present to the health services. Given the potential for fatal complications in severe cases, it is important for clinicians to consider malaria as a diagnosis when presented with patients with compatible symptoms who have history of travel to a malaria endemic country within the preceding year.

A more detailed report is available at www.hpsc.ie, under the disease name in Topics A-Z.

International information is available at www.who.int/malaria/

Table 1. Malaria notifications, by country of exposure, Ireland 2006

Country of exposure	Number notifications	% notifications
Sub-saharan Africa	71	74%
Nigeria	*48*	*50%*
Other than Nigeria	*23*	*24%*
Asia	6	6%
Not reported	19	20%
Total	**96**	**100%**

05

Blood-borne and Sexually Transmitted Infections

5.1 Hepatitis B

Summary

Number of cases in 2006: 820
Crude notification rate in 2006: 19.3/100,000
Number of acute cases in 2006: 93
Number of chronic cases in 2006: 668
Number of cases in 2005: 889

Hepatitis B is a vaccine preventable disease which is transmitted through contact with blood or body fluids of an infected person. The main routes of transmission are mother to baby, child to child, sexual contact and unsafe injections.

Notifications of hepatitis B increased every year between 1996 and 2005. The number of cases reported decreased by eight percent in 2006, with 820 notifications compared to 889 in 2005. The notification rate for 2006 was 19.3/100,000 population (figure 1). Fifty nine percent of notifications were from the HSE-E, corresponding to an age-standardised notification rate of 29.9/100,000 population.

Case classification was reported for almost all cases (n=818) and all were laboratory confirmed. Ninety three percent of notifications contained information on acute/ chronic status. Where status was known, 88% of cases were chronic (n=668) and 12% were acute (n=93).

The epidemiology of acute and chronic cases in Ireland is very different.

In 2006, 73% of acute cases were male, 24% were female and sex was not known for the remaining 3%. The highest rates were among young adults, with 74% of cases (n=69) aged between 20 and 44 years. The sex distribution of chronic cases was more even: 51% male, 44% female and 5% of unknown sex. Eighty three percent (n=556) were aged between 20 and 44 years, with the age profile for male chronic cases slightly older than that for females (figure 2).

Some information relating to risk factors was available for 69 (74%) acute cases. Where information was available, 42 (61%) acute infections were likely to have been acquired sexually. Twelve patients reported sexual contact with partners known to be positive for hepatitis B and a further 30 indicated that they could have

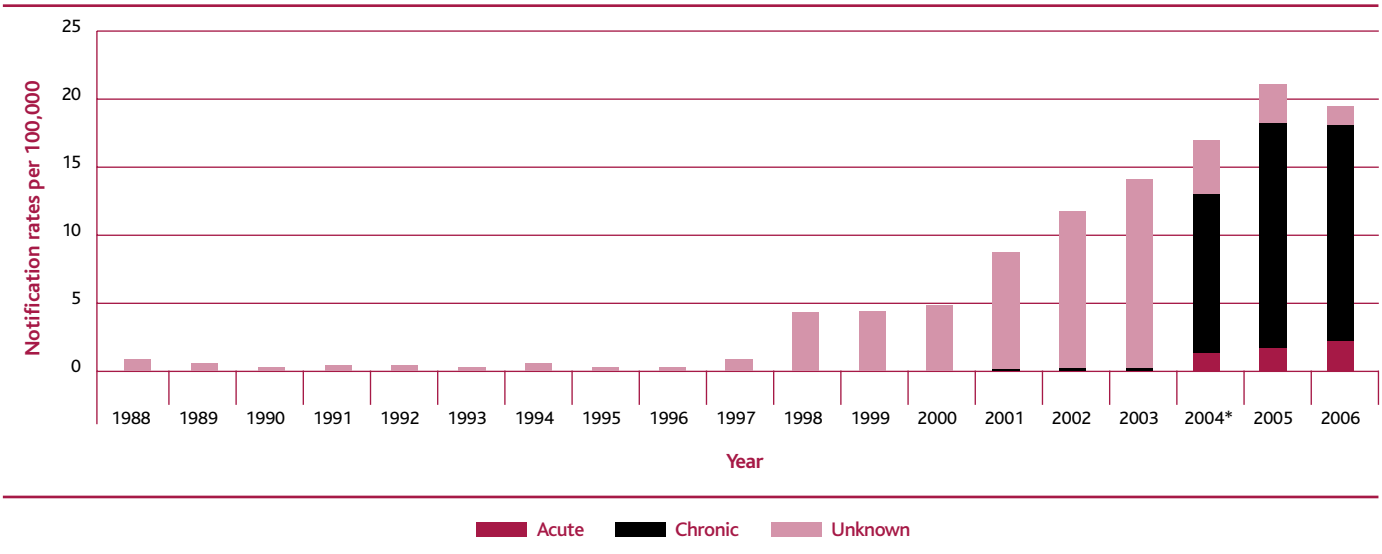

Figure 1. Crude notification rates/100,000 population for hepatitis B, 1988-2006
**Case definitions, which differentiate between acute and chronic cases of hepatitis B, and mandatory laboratory reporting of notifiable infectious diseases were introduced in 2004*

acquired the infection sexually. Of these, 20 were men who have sex with men, nine were heterosexual males, four were heterosexual females and orientation was not available for nine. Where reason for testing was known (n=68), 75% of acute cases (n=51) were tested because they were symptomatic and a further 12% (n=8) were diagnosed as a result of STI screening.

Country of birth was known for 65 acute cases, with the vast majority (86%, n=56) born in Ireland. Where country of infection was known, 82% (n=50) of acute cases were infected in Ireland and 8% (n=5) were infected in Thailand.

Risk factor data were very limited for chronic cases. Information on country of birth or asylum seeker status was available for 158 chronic cases. Over 90% (n=143) were identified as asylum seekers or as having been born in a country with high (≥8%) or intermediate (2-7%) hepatitis B endemicity. Where country of birth was known, 43% (n=61) of chronic cases were born in Sub-Saharan Africa, 30% (n=42) were born in Eastern or Central Europe and 12% (n=17) were born in East or South-East Asia. Less than 4% (n=5) were born in Ireland. Reason for testing was identified for 151 chronic cases. Thirty seven percent (n=56) were identified through asylum seeker screening programmes, 30% (n=45) were identified as a result of antenatal screening, 6% (n=9) were symptomatic and 6% (n=9) were diagnosed as a result of STI screening.

Most of the increase in hepatitis B seen in recent years is attributable to chronic cases. Information on chronic cases is limited, but available data indicate that the vast majority were born in countries where hepatitis B is endemic. It is likely that most acquired the infection at birth or in early childhood when the risk of developing chronic infection is high.

Antenatal screening for hepatitis B has been introduced in all Irish maternity hospitals. Immunisation and administration of hepatitis B immunoglobulin to babies soon after birth can prevent infection being transmitted to babies of infected mothers.

The number of acute hepatitis B notifications was relatively small, but has increased every year since differentiation of acute and chronic cases was introduced (2004). Sexual acquisition remained the dominant source of infection for acute cases. The

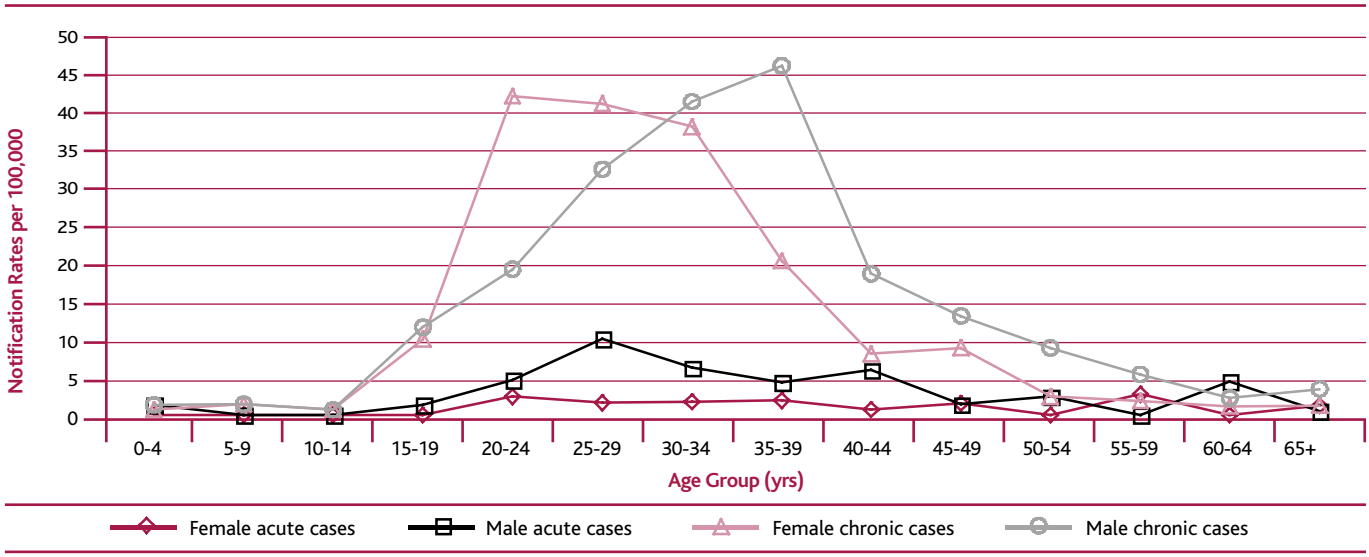

Figure 2. Age and sex-specific notification rates/100,000 population for hepatitis B, 2006

current immunisation guidelines recommend the vaccination of men who have sex with men and individuals who change sexual partner frequently. However, identifying people at risk is difficult.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) System on 3rd September 2007. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

A more detailed report is available at www.hpsc.ie, under the disease name in Topics A-Z.

5.2 Hepatitis C

Summary

Number of cases in 2006: 1,226
Age-standardised incidence rate: 28.6/100,000 population
Number of cases in 2005: 1,434

The hepatitis C virus is primarily transmitted through sharing contaminated needles and drug paraphernalia or through the receipt of unscreened blood or blood products. Sexual, occupational and perinatal transmission can also occur but are less common.

Hepatitis C became a notifiable disease in 2004 and the number of cases notified each year since then has been high. Notifications decreased by 15% to 1,226 in 2006, compared to 1,434 in 2005. This corresponds to an age-standardised notification rate of 28.6/100,000 population (table 1). Seventy five percent of cases were reported by the HSE-E, giving an age-standardised notification rate of 56.7/100,000 population.

There were significantly more male cases than female. Sixty four percent of cases were male, 34% were female and sex was not known for 20 cases. The age profile was very similar for males and females, with the highest notification rates in young adults. Seventy one percent of cases were aged between 25 and 44 years and 93% of cases were aged between 20 and 54 years (figure 1).

Risk factor information was not routinely available for cases of hepatitis C in 2006. However studies in Irish settings and anecdotal evidence indicate that the majority of newly diagnosed cases are occurring in injecting drug users and the observed age and sex profile of cases supports this.

An enhanced surveillance system for hepatitis C was implemented in early 2007 and it is hoped that this will help in identifying populations at risk and planning public health intervention strategies.

The figures presented in this summary are based on data extracted from the Computerised Infectious

Table 1. Number of hepatitis C notifications and age-standardised notification rates, 2004-2006

Year	Number of notifications	Age-standardised notification rates/100,000 population
2004	1131	25.5
2005	1434	33.5
2006	1226	28.6

Disease Reporting (CIDR) System on 3rd September 2007. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

A more detailed report is available at www.hpsc.ie, under the disease name in Topics A-Z.

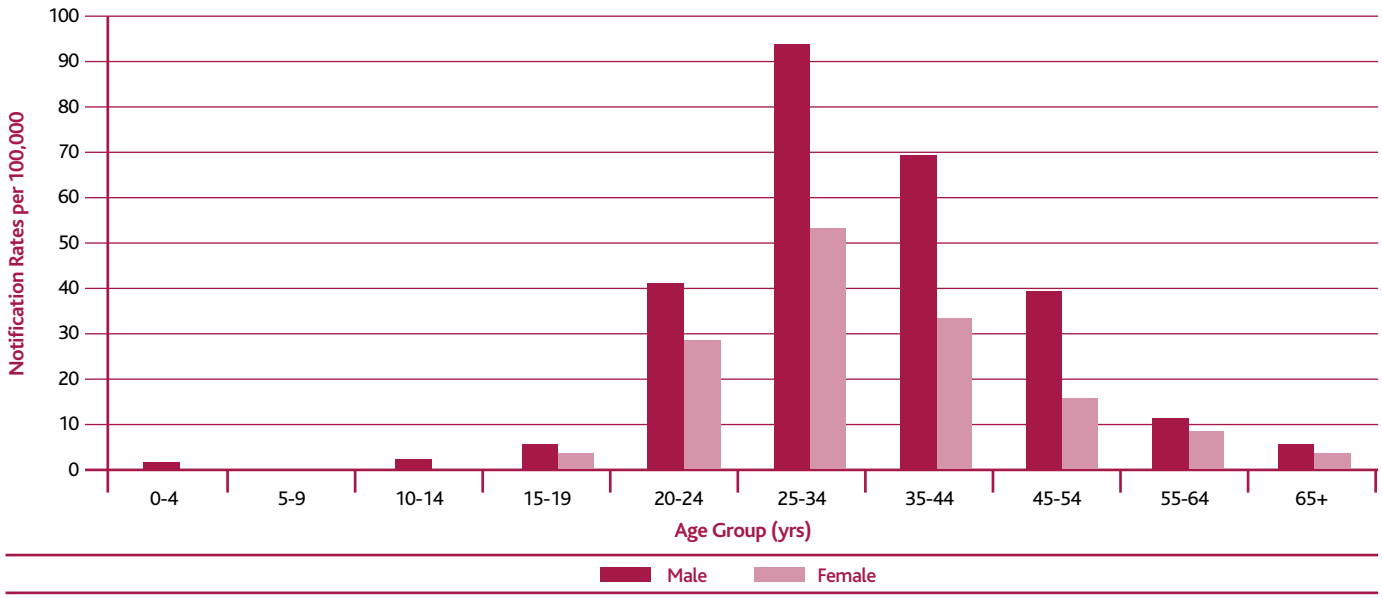

Figure 1. Age and sex-specific notification rates/100,000 population for hepatitis C, 2006

5.3 HIV and AIDS

Summary

Number of HIV cases in 2006: 337
Number of AIDS cases in 2006: 16
Crude HIV incidence rate: 79.4 per million population
Number of deaths in AIDS cases: 3

A total of 337 newly diagnosed HIV infections were reported to the HPSC during 2006. This compares to 318 diagnosed in 2005 and represents a 6.0% increase. The rate of newly diagnosed HIV infection in Ireland in 2006 was 79.4 per million population. The cumulative total number of HIV infections reported in Ireland since surveillance began to the end of December 2006 is 4,419.

Incomplete data were received for 51 of the cases (15.1%) reported in 2006. This makes the analysis of data and interpretation of trends difficult. It is also important to note that the figures do not represent the numbers of people infected with HIV in Ireland but rather provide information on the number of new diagnoses in a given time period. The number of new diagnoses reported is dependent on patterns of testing and reporting.

Of the 337 newly diagnosed cases, 169 were heterosexually acquired. This compares to 168 in 2005 and 178 in 2004. There were 83 new diagnoses among men who have sex with men (MSM) during 2006 compared to 57 in 2005 and 64 in 2004. There were 57 new diagnoses among injecting drug users (IDUs) during 2006 compared to 66 in 2005 and 71 in 2004. However, these data should be interpreted with caution as information on risk group is unavailable for 22 of the cases newly diagnosed in 2006, making interpretation of trends difficult. Figure 1 shows probable route of transmission for newly diagnosed cases among the three major risk groups since 1994.

HIV infection was newly diagnosed in three children in 2006. The probable route of transmission for two cases was mother to child transmission (MCT) but was unknown for the third case whose country of birth was sub-Saharan Africa (SSA). The mothers of the two MCT cases were both born in countries with generalised HIV epidemics and were diagnosed after the birth of the

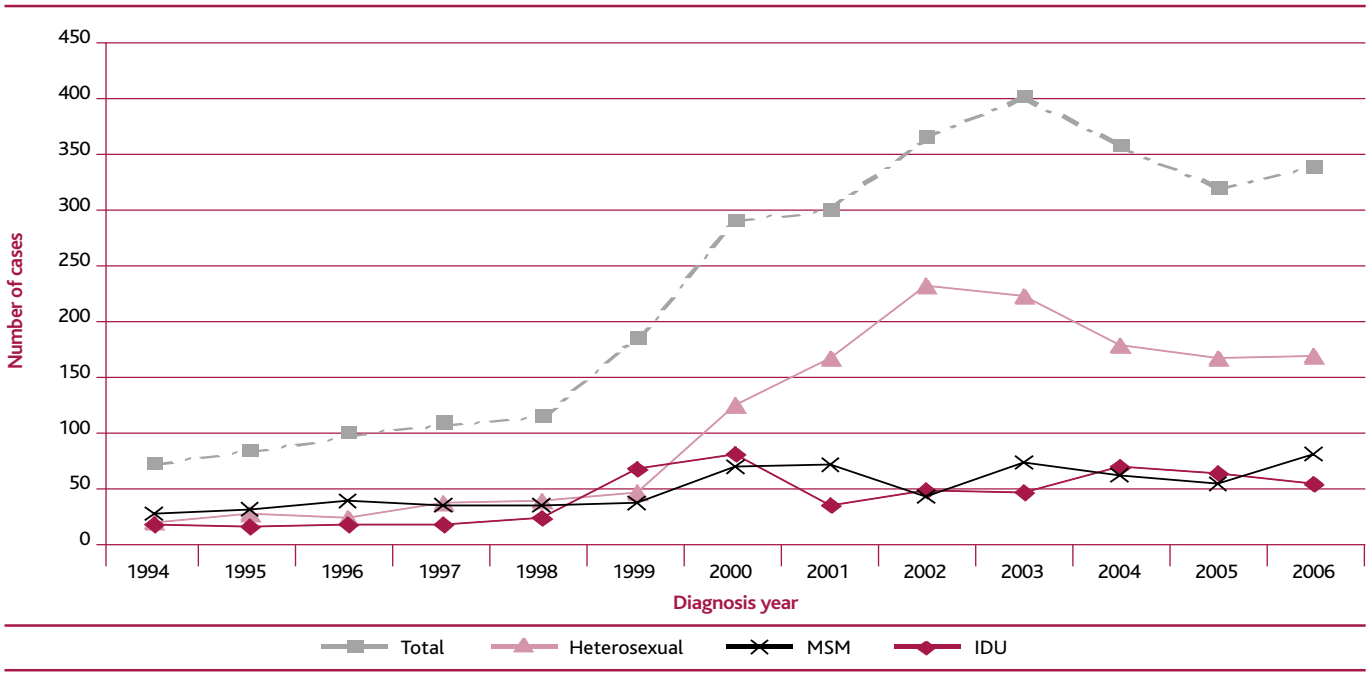

Figure 1: Newly diagnosed HIV infections in Ireland among Heterosexuals, MSM and IDUs (1994 to 2006)

child. In addition, there were 115 babies born to a HIV infected mother during 2006: 72 are not infected and 43 remain of indeterminate status (i.e. do not meet the criteria for HIV infection and are <18 months at time of test).

Most of the newly diagnosed cases (76.0%) were aged between 20 and 40 years. The mean age at HIV diagnosis was 34.0 years. The mean age among females was 30.8 years and among males was 35.9 years, a difference of 5.1 years. The mean age at HIV diagnosis was 32.2 years in IDUs, 34.1 years in heterosexuals and 36.3 years in MSM.

Of the 337 cases, 212 (62.9%) were male and 123 (36.5%) were female. Gender was unknown for two cases. Of the 123 newly diagnosed cases among females, the majority (77.2%) were acquired heterosexually and 26 (21.1%) were reported to be pregnant at HIV diagnosis. Of the newly diagnosed cases among males, 39% were among MSM and 35% were among heterosexuals.

Of the 283 cases where geographic origin* was known, 125 were born in Ireland, 109 were born in SSA and 20 were born in other countries in Western Europe. Information on geographic origin is unavailable for 54 of the newly diagnosed cases. Of the 169 cases acquired through heterosexual contact, 104 were born in SSA (63 female and 41 male) and 33 were born in Ireland (17 female and 16 male).

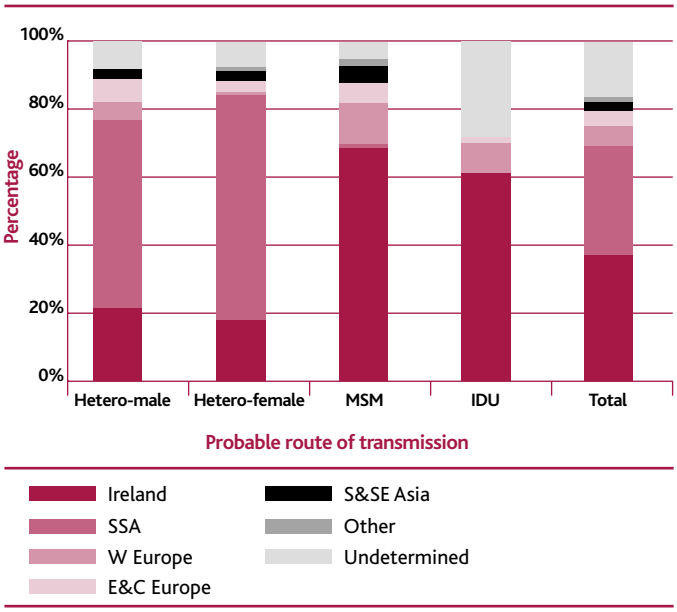

Figure 2: Newly diagnosed HIV infections in Ireland by probable route of transmission and geographic origin (2006)
** Geographic origin is based on country of birth as used by EuroHIV. "Other" includes "East Asia and Pacific" and "Latin America"*

Information on stage of infection at time of HIV diagnosis was available for 279 of the 337 cases. Of the 279 cases, 201 were asymptomatic and 28 were diagnosed with AIDS at the time of HIV diagnosis. Of the 28 late diagnoses, 17 were heterosexual (13 male and 4 female), six were MSM and four were IDUs (all male). Of the 17 late diagnoses in heterosexuals, 13 were born in SSA.

By the end of 2006, 909 cases of AIDS were reported in Ireland since surveillance began. Of these, 397 are reported to have died. A total of 451 deaths have been reported in HIV infected individuals in Ireland since surveillance began. Information on cause of death has been supplied since the introduction of HIV case based reporting in 2001. Of the 28 deaths that occurred among AIDS cases between 2002 and 2006, the cause of death was reported as AIDS in 24 cases (85.7%), HIV/AIDS related in one case (3.6%), non-AIDS in two cases (7.1%) and unknown in one case (3.6%).

It is of concern that for 28 of the newly diagnosed cases in 2006, AIDS was diagnosed at the same time as HIV diagnosis. These patients would not have had the opportunity to benefit from treatment prior to AIDS diagnosis. This highlights the importance of HIV testing services in all the appropriate settings, as diagnosis at an early stage in the course of HIV infection facilitates early intervention and treatment.

A more detailed report is available at www.hpsc.ie, under the disease name in Topics A-Z.

5.4 Sexually Transmitted Infections (STIs), 2005

Summary

Total number of STI notifications in 2005: 10,142

Most common STIs reported in 2005:

Ano-genital warts: 3,456 cases (88.2/100,000)
Chlamydia trachomatis infection (genital): 3,353 cases (85.6/100,000)
Non-specific urethritis: 2,106 cases (53.8/100,000)
Herpes simplex (genital): 441 cases (11.3/100,000)
Gonorrhoea: 342 cases (8.7/100,000)

Clinicians and laboratories notify their respective Departments of Public Health of anonymised probable and confirmed cases of sexually transmitted infections (STIs). These notifications are then reported to the HPSC in aggregated form on a quarterly basis. Because of delays in STI reporting, annual data are not always available nationally in a timely manner. Consequently, this report focuses on STIs notified to HPSC in 2005. The figures presented in this chapter are based on those in the Annual STI Report for 2005, published in November 2006. Data for 2006 were not yet completed at the time of writing.

In 2005, 10,142 STIs were reported in Ireland, a 5.2% decrease compared to 2004 when 10,695 STIs were reported (table 1). This decline was largely attributable to a drop in the number of ano-genital warts and non-specific urethritis notifications. The marked declines in these infections were unexpected given the observed increasing trends in recent years. Three infectious diseases accounted for 88% of all STI notifications in 2005: ano-genital warts, *Chlamydia trachomatis* and non-specific urethritis. Between 2004 and 2005, notifications for chlamydia increased by 19.6%, syphilis almost doubled (95.8% increase) and gonorrhoea increased by 26.7%. (table 1).

STIs in males accounted for 58.4% of all notifications; 40.5% were in females. Gender data were not reported for 1.1% of notifications (table 2). The number of notifications among males generally exceeded that of females for all notifiable diseases with the exception of *C. trachomatis*, herpes simplex and trichomoniasis. In 2005, the highest number of notifications was in the 20-29 year age group, accounting for 63.6% of all STIs notified. Furthermore, this age group had the highest number of notifications for each of the STI diseases except syphilis (table 2).

Table 1 Notifiable sexually transmitted infections from 1999 to 2005

Sexually Transmitted Infection	1999	2000	2001	2002	2003	2004	2005
Ano-genital warts	3049	3735	3993	3932	3981	4174	3456
Chancroid	1	16	1	1	0	1	0
Chlamydia trachomatis infection (genital)	869	1343	1649	1922	2258	2803	3353
Gonorrhoea	175	290	349	214	186	270	342
Granuloma inguinale	1	0	0	0	0	1	0
Hepatitis B (acute or chronic)	2	15	39	57	112	85	78
Herpes simplex (genital)	275	269	331	358	375	411	441
Lymphogranuloma venereum	2	0	0	1	0	0	1
Non-specific urethritis	1265	1726	1634	2025	2332	2746	2106
Syphilis	6	46	279	303	235	144	282
Trichomoniasis	47	78	64	73	59	60	83
Total	**5692**	**7518**	**8339**	**8886**	**9538**	**10695**	**10142**

During 2005, 49% (n=4,968) of all STI notifications were from the HSE-E. HSE-E, HSE-MW, HSE-SE, HSE-S, and HSE-W accounted for 94.4% of the STI notifications in 2005 (table 3). Almost half of all notifiable STIs in 2005 were notified by the HSE-E: syphilis (78.4%), gonorrhoea (71.9%), herpes simplex (57.8%), *C. trachomatis* (51.3%), non-specific urethritis (49.4%), hepatitis B (acute or chronic) (48.7%) and ano-genital warts (41.3%). The breakdown of STI data by geographical area should, however, be interpreted with caution, as figures are largely a reflection of the area where cases availed of STI services rather than a reflection of the burden of STIs in the population in that area (table 3). This is because details of patients' place of residence are not included on all STI notifications.

Summary Statistics on Selected STIs, 2005

Ano-genital warts

In 2005, 3,456 cases of ano-genital warts were notified (88.2/100,000). These notifications constituted 34.1% of all STI notifications reported in that year. This number of ano-genital warts cases reported represents a decline of 17.2% since 2004. More cases were notified among males than females (1,899 versus 1,547). Cases were most frequently notified in the 20-29 year old age group, which had 65.5% of all ano-genital warts reported.

Chlamydia trachomatis infection (genital)

The crude incidence rate in 2005 for *C. trachomatis* infection was 85.6/100,000 (3,353 notifications). Chlamydia notifications constituted 33.1% of all STI notifications reported in that year. The number of chlamydia cases in 2005 is an increase of 19.6% since 2004. More cases were notified among females than males (1,763 versus 1,518). The 20-29 year old age group had the most reported cases with 68.7% of the total number notified.

Non-specific urethritis

In 2005, 2,106 cases of non-specific urethritis were notified (53.8/100,000). These notifications constituted 20.8% of all STI notifications reported in that year. The number of non-specific urethritis cases reported is a decline of 23.3% since 2004. Considerably more cases

Table 2 Notified sexually transmitted infections by age group and gender, 2005

Sexually Transmitted Infection	0 - 19	20 - 29	30 - 39	40+	Age Unknown	Male	Female	Gender Unknown	Total
Ano-genital warts	386	2265	589	194	22	1899	1547	10	3456
Chancroid	0	0	0	0	0	0	0	0	0
Chlamydia trachomatis infection (genital)	473	2305	459	101	15	1518	1763	72	3353
Gonorrhoea	40	163	89	45	5	303	32	7	342
Granuloma inguinale	0	0	0	0	0	0	0	0	0
Hepatitis B (acute or chronic)	5	40	20	13	0	49	28	1	78
Herpes simplex (genital)	29	249	89	68	6	165	275	1	441
Lymphogranuloma venereum	0	0	0	1	0	1	0	0	1
Non-specific urethritis	170	1321	424	181	10	1800	297	9	2106
Syphilis	4	78	90	110	0	184	95	3	282
Trichomoniasis	6	27	25	25	0	2	71	10	83
Total	**1113**	**6448**	**1785**	**738**	**58**	**5921**	**4108**	**113**	**10142**
(% of Total)	**11.0**	**63.6**	**17.6**	**7.3**	**0.6**	**58.4**	**40.5**	**1.1**	**100**

were notified among males than females (1,800 versus 297). Cases were most frequently notified in the 20-29 year old age group, which had 62.7% of all non-specific urethritis reported.

Herpes simplex (genital)
The crude incidence rate for genital herpes in 2005 was 11.3/100,000 (441 notifications). The notifications constituted 4.3% of all STI notifications reported in that year. The number of cases in 2005 is an increase of 7.3% since 2004. More cases were notified among females than males (275 versus 165). The 20-29 year old age group had the most reported cases with 56.5% of the total number notified.

Gonorrhoea
In 2005, 342 cases of gonorrhoea were notified (8.7/100,000). These notifications constituted 3.4% of all STI notifications reported in that year. The number of gonorrhoea cases reported represents an increase of 26.7% since 2004. More cases were notified among males than females (303 versus 32). Gonorrhea cases were most frequently notified in the 20-29 year old age group, which had 47.7% of all such cases reported.

Note: Crude incidence rates calculated for the year 2005 based on census 2002 denominator data

A more detailed report is available at www.hpsc.ie, under the disease name in Topics A-Z.

Sexually Transmitted Infection	HSE-E	HSE-M	HSE-MW*	HSE-NE	HSE-NW	HSE-SE	HSE-S	HSE-W	Total
Ano-genital warts	1427	0	269	0	154	345	644	617	3456
Chancroid	0	0	0	0	0	0	0	0	0
Chlamydia trachomatis infection (genital)	1720	114	137	55	135	202	445	545	3353
Gonorrhoea	246	3	9	5	8	11	26	34	342
Granuloma inguinale	0	0	0	0	0	0	0	0	0
Hepatitis B (acute or chronic)	38	0	17	0	1	0	16	6	78
Herpes simplex (genital)	255	2	25	2	5	32	59	61	441
Lymphogranuloma venereum	1	0	0	0	0	0	0	0	1
Non-specific urethritis	1041	0	508	0	52	131	308	66	2106
Syphilis	221	2	3	2	3	8	12	31	282
Trichomoniasis	19	7	2	8	10	2	12	23	83
Total	**4968**	**128**	**970**	**72**	**368**	**731**	**1522**	**1383**	**10142**
% of Total	**49.0**	**1.3**	**9.6**	**0.7**	**3.6**	**7.2**	**15.0**	**13.6**	**100.0**

** Based on data provided prior to November 2006. In January 2007, HPSC was informed by HSE-MW that incorrect data had been provided by the regional STI clinic. To date, the corrected data has not yet been received.*

5.5 Syphilis

Summary

Number of case-based syphilis reports, 2006: 103
Crude incidence rate, 2006: 2.4/100,000
Number of early syphilis cases, 2006: 61

Since 2000 case-based records are available nationally on syphilis cases. An enhanced surveillance system is in place whereby enhanced forms are completed by Departments of Public Health in conjunction with the clinician and are then forwarded to HPSC. The data presented in this chapter are on the case-based reports received on syphilis (some with enhanced details), which are held on a national database at HPSC. The syphilis figures presented here are not comparable with the aggregate counts of syphilis notifications provided by HSE areas as part of the routine quarterly reporting of sexually transmitted infections (See STI chapter for more details). This difference arises because case-based reports are not received for all syphilis cases notified.

The first section of this report focuses on 2006 data and the second part on the main syphilis trends between 2000 and 2006.

In 2006, case-based records were received on 103 syphilis cases (2.4/100,000). Enhanced surveillance forms were completed for 102 of these cases. Based on the 102 cases with enhanced information, 61 cases were diagnosed with early infectious syphilis (i.e. primary, secondary and early latent stages) and the syphilis stages diagnosed for the remaining 41 cases were latent, late, other or unknown.

The 61 cases of early syphilis were analysed in more detail, since the disease is infectious at this stage and therefore has the greatest public health implications. Cases ranged in age from one to 62 years of age (median 32 years). The majority of cases were diagnosed in the HSE-E (74%, n=45) and the majority of the cases were also resident in HSE-E (64%, n=39/61). Most cases were acquired by those who were born in Ireland (64%, n=39).

Eighty percent of early syphilis cases (n=49/61) were men who had sex with men (MSM). These cases ranged between 20 and 54 years of age (median 32 years), with the 25-34 years age group having the highest number of cases. Primary syphilis accounted for 35% (n=17) of the cases, as did secondary syphilis (n=17). Early latent accounted for 20% (n=10) and for five cases (10%)

Table 1 A breakdown of early syphilis cases by sexual orientation in Ireland, 2000-2006, based on completed enhanced forms

Diagnosis	Heterosexual Male	Heterosexual Female*	Heterosexual Unknown	MSM**	Unknown	Total
Primary	34	12	0	195	3	244
Secondary	23	27	1	183	0	234
Early Latent	23	28	0	122	4	177
Other	0	1	0	9	2	12
Total	**80**	**68**	**1**	**509**	**9**	**667**

** Includes one female bisexual, primary case*
*** Includes 53 male bisexual cases*

the distinction was not made between primary and secondary syphilis. Oral sex was the only type of sexual behaviour reported by 30.6% (n=15/49) of these early syphilis MSM cases. The annual range of male sexual contacts among early syphilis MSM cases was between 0 and 200. The most common range was 1-9 partners in 61.2% (n=30/49) of cases overall, and also in the 25-34 year old age group (23/49; 46.9%).

Between 2000 and 2006, a total of 1,596 case-based reports were received on syphilis. Most syphilis cases were among males (72%; n=1,143) while females accounted for 28% (n=444). Cases ranged in age from 0 to 95 years, with a median age of 33 years. The majority of cases occurred in the 25-34 year old age group (40%). Forty two percent (n=765) were classified as early, infectious syphilis. The other stages reported were: congenital (0.3%), latent (4.0%), late (20.6%) and other/unknown (27.2%).

Enhanced surveillance forms were completed for over half (57%, n=914) of individual case-based reports and 667 of these were reported as early syphilis. The trends regarding early syphilis cases in this subset with enhanced information were similar to the larger case-based dataset; the majority of cases were male (598/667) and most cases occurred in the 25-44 years age group (70%; n=466). Of the 667 early syphilis cases with enhanced data, 105 (16%) were HIV positive.

Early syphilis is far more common in the MSM population in Ireland compared to the non-MSM population (figure 1, table 1). There were 509 MSM cases reported between 2000-2006, accounting for 76.3% of all early syphilis cases with enhanced information.

Oral sex was the only type of sexual behaviour reported by 31.8% (n=162/509) of the early syphilis MSM cases. The annual range of male sexual contacts among early syphilis MSM cases was between 0 and 200. Overall, the most common range was 1-9 partners in 58.3% (n=297/509) of cases, and also in the 25-34 year old age group (215/509; 42.2%).

Eight percent (n=40/509) of MSM cases reported were the result of re-infections. The most frequent reason for attendance among early syphilis MSM cases was self-referral (35%), followed by contact referral (13%), general practice (10%) and routine visit (10%) attendance.

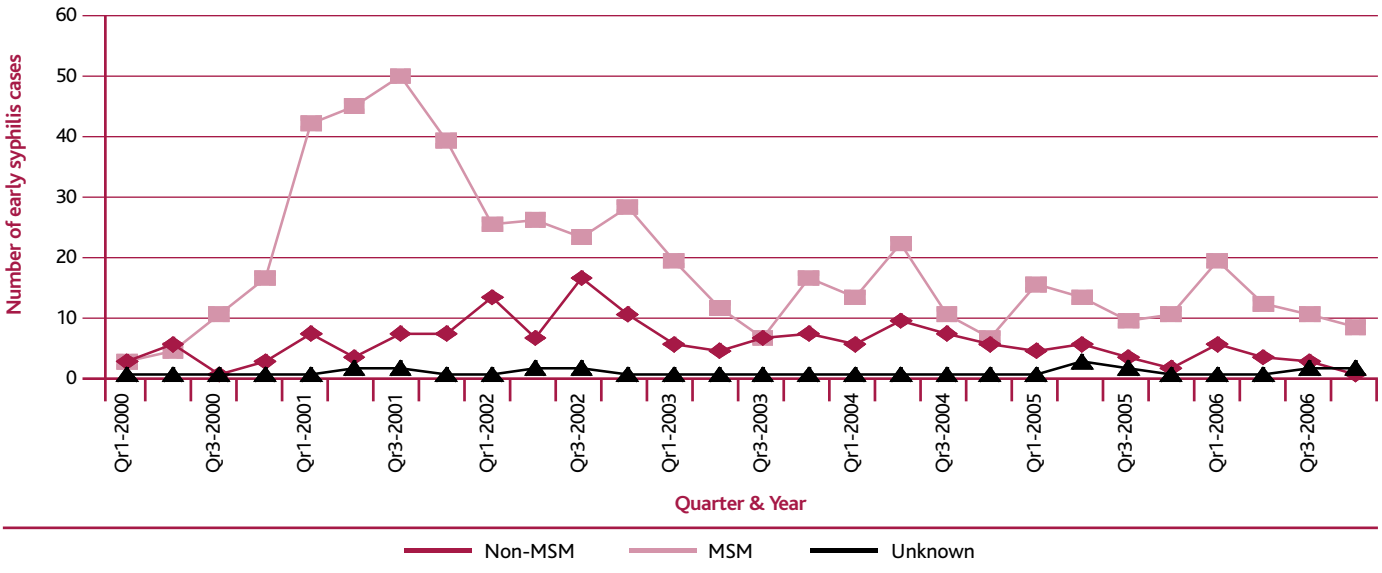

Figure 1. Quarterly number of early syphilis cases diagnosed in Ireland by sexual orientation, 2000-2006, based on completed enhanced forms

A total of 96 early syphilis MSM cases (19%) were reported to be HIV positive between 2000 and 2006. Concurrent STIs were relatively common with 21% of MSM with early syphilis (n=106/509) having an STI other than HIV. Past STIs were also quite common with 40% (n=206/509) of MSM with early syphilis reporting a previous history. In addition, 47 of these cases with a past history of STIs were HIV positive, nine of which were reported being infected more than once with syphilis.

06

Other infections

6.1 Viral Encephalitis

Summary

Number of cases, 2006:16
Number of cases, 2005: 6
Crude incidence rate, 2006: 0.4/100,000

In 2006, 16 cases of viral encephalitis were notified in Ireland, which is a crude incidence rate of 0.4 per 100,000 total population. The number of viral encephalitis notifications in 2006 increased when compared with the previous two years, with six cases notified in 2005 and five in 2004. The reasons for this increase are unclear.

In 2006, the distribution of viral encephalitis cases in males and females was identical; eight cases each, giving a male: female ratio of 1.0:1.0. Cases ranged in age from three months to 77 years (table 1). Over one third of the cases (n=6; 38%) occurred in children <10 years of age and 44% were in adults 50 years of age and greater (table 1). The highest incidence rates were in children aged 1-4 years (1.7/100,000), followed by infants <1 year (1.6/100,000) and then elderly adults 65 years of age and greater (0.9/100,000) (table 1).
The causative agent was identified in all 16 cases of viral encephalitis notified; herpes simplex virus was the organism associated with seven and varicella zoster virus with the remaining nine cases. Herpes simplex virus was the predominant causative agent of viral encephalitis in children, accounting for five out of the six cases notified in the <10 year olds. Varicella zoster cases on the other hand, occurred predominantly in adults (n=8 cases, age range 16-77 years) and just one case occurred in a young child, in the 1-4 year old age group.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 27th July 2007.

Table 1. Number, crude incidence rates and proportion of viral encephalitis cases by age group in 2006

	Number	Proportion (%)	ASIR
<1	1	6	1.6
1-4	4	25	1.7
5-9	1	6	0.3
10-44	3	19	0.1
45-64	3	19	0.3
65+	4	25	0.9
All ages	16	100	0.4

ASIR, age specific incidence rates

6.2 Viral Meningitis

Summary

Number of cases, 2006:148
Number of cases, 2005: 35
Crude incidence rate, 2006: 3.5/100,000

In 2006, 148 cases (3.5/100,000 total population) of viral meningitis were notified in Ireland. The majority of cases were classified as confirmed (82%, n=121), 17 as probable and for 10 the case classification was not specified. More cases occurred in males (n=90) than in females (n=58) giving a ratio of 1.6:1.0. No deaths due to viral meningitis were notified in 2006.

Cases ranged in age from one month to 58 years with a median age of 15 years. Eighty eight percent of all cases were <35 years of age. Children <1 year of age had the highest incidence rate - 50.8 per 100,000, followed by the 15-19 year olds, 7.9/100,000 (table 1). The causative agent was identified as echovirus for two of the cases, varicella zoster for two, enterovirus for 117 and for 27 cases the causative agent was unknown (table 1).

In Ireland, viral meningitis activity tends to be highest from June to November, peaking between July and September. In 2006, viral meningitis was low between January and June with on average 2.7 cases being notified per month. Activity increased in July when 27 cases were notified. This activity peaked in August with 67 cases, this month alone accounted for 45% of the total notifications for the year. By December activity had returned to low levels (n=3).

The number of cases notified in 2006 represents a substantial increase compared with 2005 (n=35) and 2004 (n=23). Over the 10 year period from 1997–2006, the annual number of notifications ranged from 23-161 (figure 1).

A high number of cases occurred in 2000 (n=98), while the highest number occurred in 2001 (n=161). These upsurges in notifications coincided with an increase in reports by the National Virus Reference Laboratory (NVRL) of laboratory confirmed non-polio enterovirus isolates. The predominant strains were echovirus type 13 in 2000 and echovirus type 30 in 2001.

The increase in viral meningitis notifications in 2006 also coincided with a rise in the number of enteroviral

Table 1. Number and age specific incidence rates of viral meningitis notifications, 2006

	Echovirus	Varicella zoster	Enterovirus	Unknown	Total	ASIR
<1	0	0	30	1	31	50.8
1-4	0	0	1	3	4	1.7
5-9	0	0	15	5	20	6.9
10-14	0	1	10	4	15	5.5
15-19	0	0	18	5	23	7.9
20-24	0	0	9	3	12	3.5
25-34	1	0	22	2	25	3.5
35-44	1	0	11	3	15	2.4
45+	0	1	1	1	3	0.2
All ages	**2**	**2**	**117**	**27**	**148**	**3.5**

ASIR, age specific incidence rate

isolates seen by NVRL. No one strain dominated. Echovirus type 6 and 13 were the strains most commonly isolated. Towards the end of 2005 NVRL introduced PCR testing of CSF samples for enteroviral nucleic acid. This was in addition to the routine method of viral isolation from stool samples. The use of more sensitive detection methods may also have contributed to the increase in viral meningitis notifications seen in 2006.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 18th July 2007.

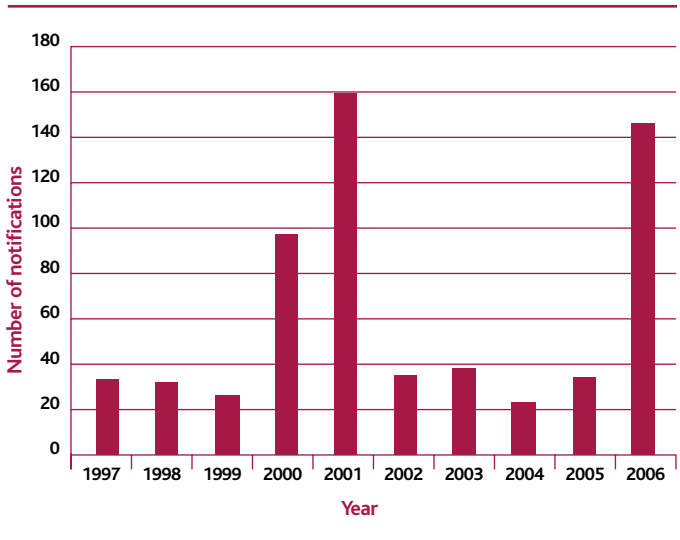

Figure 1. Annual number of viral meningitis notifications in Ireland, 1997-2006

6.3 Creutzfeldt-Jakob disease

Summary

Number of notifications, 2006: 6
Number of notifications, 2005: 4

In 2006, six cases of Creutzfeldt-Jakob disease (CJD) were notified compared to four in 2005. All six cases in 2006 were aged greater than 54 years and five were male. Five of the cases were reported as sporadic CJD and one as familial CJD.

In total, 38 cases of CJD were notified since CJD was first specified as a notifiable disease in December 1996, giving an average of approximately four notifications each year.

Figure 1 shows the 38 CJD notifications by age group. Over 80% (n=31) of the cases were aged greater than 54 years. Of the 38 cases, 21 were male and 17 were female. The CJD type was reported for 37 of the cases; 34 were sporadic CJD, two were familial CJD and one was iatrogenic CJD.

Data presented in this summary are based on notifications from HSE areas and from the Irish National Creutzfeldt-Jakob Disease Surveillance Unit. The figures were extracted from the Computerised Infectious Disease Reporting (CIDR) system on the 17th August 2007 and may differ from those published previously due to ongoing updating of notification data on CIDR.

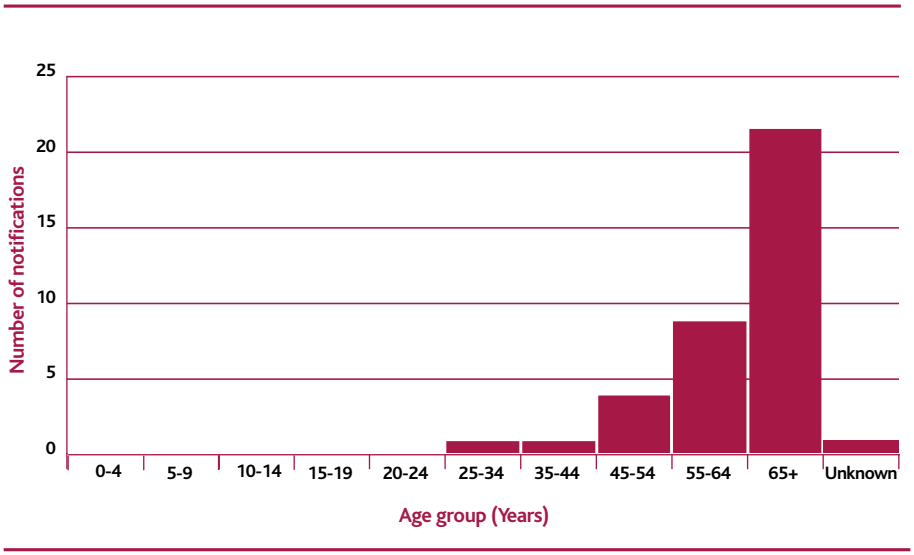

Figure 1. Number of CJD notifications (n=38) from December 1996 to 2006 by age group

6.4 Variant Creutzfeldt-Jakob disease

Summary

Number of notifications, 2006: 1
Number of notifications, 2005: 2

One case of variant Creutzfeldt-Jakob disease (vCJD) was notified during 2006. The case was male and in the age group 20-24 years.

Four cases of vCJD were notified since vCJD became notifiable in December 1996, with one case notified in 1999, two in 2005 and one in 2006.

Of the four cases of vCJD notified since 1996, two were in the age group 20-24 years, one was in the age group 25-34 years and one was in the age group 55-64 years. Two cases were male and two were female. Two of the cases had resided for prolonged periods in the United Kingdom.

Data presented in this summary are based on notifications from HSE areas and from the Irish National Creutzfeldt-Jakob Disease Surveillance Unit. The figures were extracted from the Computerised Infectious Disease Reporting (CIDR) system on the 17th August 2007 and may differ from those published previously due to ongoing updating of notification data on CIDR.

07

Infectious Disease Outbreaks

7. Outbreaks

Summary

Number of Outbreaks in 2006: 325
Number of IID outbreaks: 300
Number of non-IID outbreaks: 25

During 2006, 325 outbreaks of infectious disease were notified, responsible for at least 5200 cases of illness, and 734 hospitalisations. This was the highest number of outbreaks notified since the surveillance system began.

There were 300 gastrointestinal/ infectious intestinal disease (IID) outbreaks notified, of which at least 5057 people became ill. 72 of these outbreaks (24%) were family/household outbreaks. The number of outbreaks reported annually since 1998 is seen in figure 1. Norovirus/suspect viral outbreaks continue to be the commonest cause of IID outbreaks.

The regional distribution of all outbreaks of infectious disease, and those specifically IID are detailed in table 1. The highest number of outbreaks was reported from the HSE-E, although the highest outbreak rate was in the Midland region. The lowest outbreak rates were reported from the HSE-E and HSE-MW.

The number of general and family outbreaks of IID by pathogen and numbers ill, are outlined in table 2. Continuing the trend observed in previous years, the IID outbreaks in 2006 have been dominated by norovirus/ suspect viral outbreaks, accounting for 59% of all IID outbreaks reported in 2006 (figure 1). The two largest outbreaks reported in 2006 were both norovirus outbreaks occurring in acute hospital settings and responsible for 369 and 395 persons ill respectively.

After norovirus, the next most commonly reported IID outbreaks were acute infectious gastroenteritis, EHEC, salmonellosis, campylobacter and cryptosporidiosis.

There were 31 EHEC outbreaks reported in 2006, of which 28 were family outbreaks and three were

Table 1: All outbreaks of ID, number of IID and non-IID outbreaks, and total numbers ill in all outbreaks reported by HSE region (2006)

HSE Region	No. of Outbreaks	Outbreak rate	No. ill in all outbreaks	No. of IID outbreaks	Non-IID outbreaks
E	83	5.5	2202	80	3
M	49	19.5	435	44	4
MW	20	5.5	213	19	1
NE	23	5.8	261	20	3
NW	33	13.9	487	29	5
SE	35	7.6	492	34	1
S	59	9.5	876	52	7
W	23	5.6	228	22	1
Total	**325**	**7.7**	**5194**	**300**	**25**

general (two in crèche, one in golf club). Thirty of these outbreaks were caused by VTEC and one family outbreak was caused by a non-VTEC strain. Twenty-five outbreaks were due to VTEC O157 and five were due to VTEC O26. In terms of mode of transmission, person-to-person spread was suspected in nine VTEC outbreaks, followed by suspect foodborne mode of transmission (in four outbreaks) although no foods were found positive for VTEC during investigations. For one family outbreak in 2006, examination of water from the household private wells confirmed the presence of the *E. coli* O157 indistinguishable from the associated human isolates.

There were 20 outbreaks of salmonellosis notified in 2006; five general and 15 family outbreaks. All of these were small outbreaks, with no more than five persons reported ill in any outbreak. Eleven of the outbreaks were reported to have been associated with travel outside of Ireland. Of the general outbreaks, one was associated with a crèche and four were travel-associated.

There were eleven family outbreaks of campylo-bacteriosis notified, responsible for 25 cases of illness. All of these were small clusters of illness, with no more than three people reported ill in any outbreak.
There were eight outbreaks of cryptosporidiosis notified in 2006; three general and five family outbreaks. Two of the general outbreaks were community outbreaks and one was associated with travel. Sixty people were reported ill as a result of these outbreaks. The suspected mode of transmission for three outbreaks was person-to-person, and for four outbreaks, a waterborne mode of transmission was suspected (recreational water for two family outbreaks and drinking water for two general outbreaks). One family outbreak was associated with foreign travel.

Table 2: Number of general and family outbreaks of IID by pathogen, 2006

Disease	No. General Outbreaks	No. Family Outbreaks	Total No. Outbreaks	No. Ill
Noroviral Infection	153	2	155	3905
Acute Infectious Gastroenteritis	35	3	38	518
EHEC	3	28	31	54
Suspected Norovirus	22	0	22	369
Salmonellosis	5	15	20	49
Campylobacter Infection	0	11	11	25
Cryptosporidiosis	3	5	8	60
Hepatitis A	0	3	3	14
Shigellosis	1	2	3	12
Rotavirus	2	1	3	9
Clostridium difficile	2	0	2	18
Giardiasis	0	1	1	20
Typhoid	0	1	1	2
Aeromonas (AIG)	1	0	1	2
Norovirus & *C. difficile*	1	0	1	NK
Total	**228**	**72**	**300**	**5057**

Table 3. Non–IID outbreaks notified in 2006

Disease	No. outbreaks	No. ill
Coxsackie virus	1	5
ESBL *E. coli*	1	7
Hepatitis B	4	16
Influenza	2	14
Legionellosis	1	NK
Meningococcal disease	1	2
Mumps	5	33
M. tuberculosis	1	4
Pertussis	2	7
S. pneumoniae infection (invasive)	1	19
Suspected echo/coxsackie virus	1	7
Varicella	2	16
Viral meningitis	1	4
VRE	2	3
Total	**25**	**137**

Twenty-five outbreaks of non-IID/gastroenteric diseases were notified in 2006. Table 3 outlines the pathogens implicated and numbers ill. Mumps was the most common cause of non-IID outbreaks notified. It is hoped that surveillance data on these outbreaks will improve in the coming years.

Similar to previous years, person-to-person spread was the mode of transmission reported for the majority of outbreaks of IID in 2006. Most of these outbreaks were due to norovirus/ suspect viral.

The commonest location in which outbreaks occurred in 2006 was healthcare settings, as in previous years. 60% of all reported IID outbreaks occurred in these settings. 17% of all reported outbreaks occurred in private homes, 6% occurred in hotels and 3% in crèches. 4% of outbreaks were reported to be associated with foreign travel in 2006.

When the IID outbreaks are analysed by month of onset of illness of first case, it is seen that the majority of outbreaks occurred in the first four months of the year. This peak is attributable to the number of norovirus outbreaks that occurred at this time. Norovirus was previously known as "winter vomiting" disease due to the increase in outbreaks that would occur during winter months.

The information gathered from this national outbreak surveillance systems is used to inform public health professionals on the causes and factors contributing to outbreaks, to target prevention strategies and to monitor the effectiveness of prevention programmes.

A more detailed report is available at www.hpsc.ie, under the disease name in Topics A-Z.

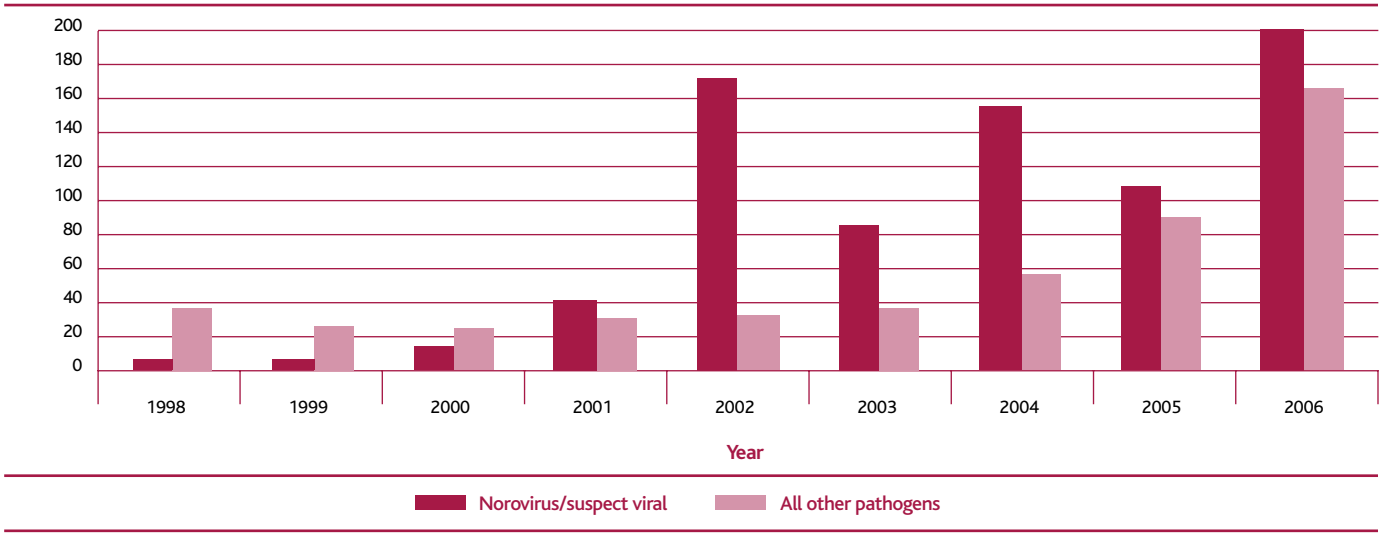

Figure 1. Number of outbreaks by year and by pathogen, 1998-2006 (Data prior to 2001 provided by FSAI)

08

Immunisation Uptake

8. Immunisation Uptake

Summary

Uptake of D_3, T_3, P_3, Hib_3 and $Polio_3$ at 12 months was 86%

Uptake of $MenC_3$ at 12 months was 85%

Uptake of D_3, T_3, P_3, Hib_3 and $Polio_3$ at 24 months was 91%

Uptake of $MenC_3$ at 24 months was 90%

Uptake of MMR_1 at 24 months was 86%

The current Irish childhood immunisation schedule recommends that babies receive one dose of vaccine against tuberculosis (BCG vaccine) at birth or by one month of age and three doses of vaccines against diphtheria (D_3), pertussis (P_3), tetanus (T_3), *Haemophilus influenzae* type b (Hib_3), polio ($Polio_3$) and meningococcal ($MenC_3$) given at two, four and six months of age. Between 12 and 15 months of age children should receive the first dose of the measles-mumps-rubella vaccine (MMR_1) and since September 2006 a booster dose of Hib is routinely offered at the same time as MMR_1. A booster dose of DTaP/Polio is scheduled for children at four to five years of age, as is a second dose of MMR vaccine. A booster dose of tetanus and diphtheria should be given to children at 11 to 14 years of age. To effectively control these vaccine preventable diseases it is recommended that at least 95% of children complete the childhood immunisation schedule.

In 2006, each HSE Area provided HPSC with immunisation uptake data on a quarterly basis. HPSC collated these data and quarterly reports were produced which are available on the HPSC website. The annual immunisation uptake rates presented here for 2006 represent the collation of the 2006 quarterly data. The proportion of children who completed the recommended childhood immunisation schedule by 12 months (born between 01/01/2005 and 31/12/2005) or 24 months (born between 01/01/2004 & 31/12/2004) of age in 2006 is reported.

Table 1. Annual immunisation uptake rates by HSE Area for children 12 and 24 months of age in 2006

	% Uptake at 12 months Cohort born 01/01/2005 - 31/12/2005						% Uptake at 24 months Cohort born 01/01/2004 - 31/12/2004					
HSE Area	**D_3**	**P_3**	**Hib_3**	**$Polio_3$**	**$MenC_3$**	**BCG**	**D_3**	**P_3**	**Hib_3**	**$Polio_3$**	**$MenC_3$**	**MMR_1**
HSE-E	82	82	82	82	82	na	88	88	88	88	88	82‡
HSE-M	92	92	92	92	92	94	97	97	96	97	97	94
HSE-MW	89	89	89	89	89	93	91	91	91	91	91	88
HSE-NE	89	89	89	89	86	na	93	93	93	93	92	89
HSE-NW	92	92	91	92	91	92	95	95	95	95	93	91
HSE-SE	86	86	86	86	86	94	91	91	91	91	90	87
HSE-S	87	87	87	87	86	88*	93	93	93	93	93	88
HSE-W	88	88	88	88	87	na	93	92	93	93	90	86
Ireland	**86**	**86**	**86**	**86**	**85**	**93†**	**91**	**91**	**91**	**91**	**90**	**86‡**

Since T_3 uptake identical to D_3 uptake only D_3 uptake figures presented
**HSE-S part coverage of neonatal BCG (i.e. Kerry only)*
†Based on data from five of the eight HSE Areas
‡This figure includes the Quarter-1 2006 HSE-E figure, which is an estimate only due to technical problems with extraction of MMR_1 data from the HSE-E database

Immunisation uptake rates at 12 months
National immunisation uptake rates for D_3, P_3, T_3, Hib_3 and $Polio_3$ in children 12 months of age in 2006 were 86%. This was an improvement of one percent compared to 2005. $MenC_3$ uptake in 2006 was 85%, unchanged from 2005.

Uptake of D_3, P_3, T_3, Hib_3, $Polio_3$ and $MenC_3$ ranged from 82% in the HSE-E to 91-92% in the HSE-M and HSE-NW (table 1). Seven of the eight HSE Areas had uptake rates of greater than 85% (table 1).

BCG uptake data were available from five of the eight HSE Areas. These five areas represent approximately a third of the national birth cohort. Where data were available national BCG uptake was 93% in 2006, unchanged compared to 2005.

Immunisation uptake rates at 24 months
National immunisation uptake rates, in children 24 months of age in 2006, for D_3, P_3, T_3, Hib_3 and $Polio_3$ were 91% and 90% for $MenC_3$. Compared with 2005 uptake of these vaccines increased by one percent (figure 1).

Uptake of D_3, P_3, T_3, Hib_3, $Polio_3$ and $MenC_3$ ranged from 88% in the HSE-E to 96-97% in the HSE-M (table 1). Seven of the eight HSE Areas had 90% or greater uptake for all these vaccines. The target uptake of 95% was reached for D_3, P_3, T_3, Hib_3, $Polio_3$ and $MenC_3$ in the HSE-M and for D_3, P_3, T_3, Hib_3 and $Polio_3$ in the HSE-NW during 2006.

During 2006 MMR_1 uptake was 86% nationally (this figure includes the Quarter-1 2006 HSE-E figure which is an estimate only due to technical problems with extraction of MMR_1 data from the HSE-E database). In 2006, uptake of MMR_1 ranged from 82% in the HSE-E to 94% in the HSE-M (table 1). None of the HSE Areas achieved the target uptake of 95% for MMR_1 for all of 2006; however, in Quarter-1 2006 MMR_1 uptake was 95% in the HSE-M. MMR_1 uptake was also 95% in HSE-M in Quarter-4 2005. These are the only times any HSE Area has reached the target uptake of 95% for MMR_1

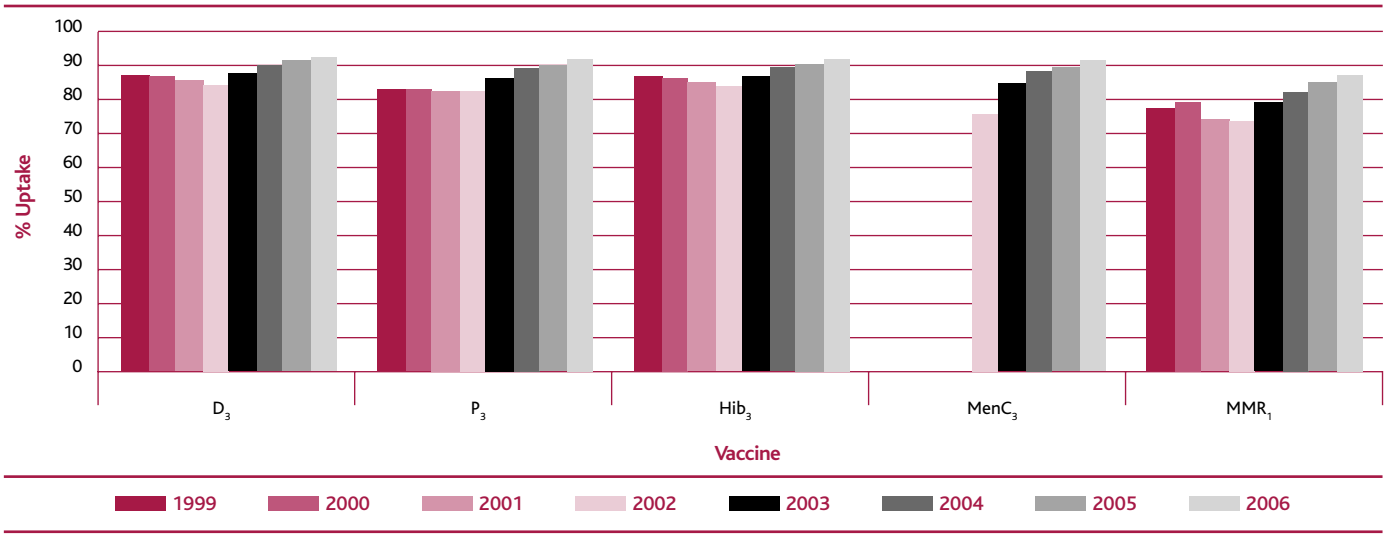

Figure 1. National annual immunisation uptake rates at 24 months
Since T_3 uptake identical to D_3 uptake only D_3 uptake figures presented and since $Polio_3$ uptake almost identical to Hib_3 uptake only Hib_3 figures presented
The 2006 MMR_1 figure includes the Quarter-1 2006 HSE-E figure, which is an estimate only due to technical problems with extraction of MMR_1 data from the HSE-E database.
The 2005 MMR_1 uptake figure is incomplete as the HSE-E was unable to provide MMR data for Quarter-4 2005, due to technical problems with extraction of MMR_1 data from the HSE-E database.

since the collation of these statistics commenced in 1999.

Further improvements in uptake are necessary so that the 95% target rate is achieved nationally for all vaccines. In 2006, national uptake rates at 24 months for D_3, P_3, T_3, Hib_3, $Polio_3$ and $MenC_3$ were four to five percent below the target rate while MMR_1 was nine percent below the target rate.

A more detailed report is available at www.hpsc.ie, under the disease name in Topics A-Z.

09

Antimicrobial Consumption and Resistance

9.1 Antimicrobial Consumption

Summary

Outpatient antibiotic consumption, 2006: 21.1 DID
Outpatient antibiotic consumption, 2005: 20.5 DID
Median hospital antibiotic consumption, 2006: 93.5 DBD
Number of acute public hospitals with data, 2006: 33

Ireland participates in the European Surveillance of Antimicrobial Consumption (ESAC) which aims to collect systemic antibiotic usage data from the outpatient (ambulatory, community or primary care) setting and from the hospital setting. Consumption is measured in Defined Daily Dose (DDD), which is the assumed average maintenance dose per day for a drug used for its main indication in adults. Rates are calculated in DDD per 1000 inhabitants per day (DID).

Outpatient Antibiotic Consumption

The overall outpatient antibiotic consumption for Ireland in 2006 was 21.1 DID, a rise from the previous year's rate of 20.5 DID, and has been rising steadily at 2.4% per year since 1993 when the rate was 16.1 DID. In an ESAC report of 2002 data for 32 European countries, the range of outpatient antibiotic usage was 10.0 DID (the Netherlands) to 32.2 DID (France), thus outpatient antibiotic usage in Ireland is mid-range in Europe. However, many European countries (including France) have demonstrated a reduction in antibiotic consumption in recent years, in contrast to the increasing consumption in Ireland.

In Ireland in 2006, outpatient consumption of penicillins accounted for the largest class used (50% of total at 10.5 DID), followed by tetracyclines (16%, 3.4 DID), macrolides (16%, 3.3 DID), cephalosporins (9%, 1.9 DID), quinolones (4%, 0.9 DID) and sulphonamides (4%, 0.9 DID). Others comprising aminoglycosides and miscellaneous accounted for less than 1% at 0.1 DID.

Penicillin in combination with beta-lactamase inhibitor (such as amoxicillin/clavulanate) accounted for the largest proportion of penicillins and showed a dramatic rise over the last seven years (3.2 DID in 2000 to 5.1 DID in 2006). Broad-spectrum penicillin (such as ampicillin and amoxicillin) usage was stable but high (3.6 DID).

There was considerable variability in the overall outpatient antibiotic usage at county level (16.2 to 26.3 DID). Furthermore, analysis of Primary Care Reimbursement data showed that those entitled to reimbursement (representing 30% of the population) are prescribed about 60% of the antibiotics in terms of cost. The fluctuation in outpatient antibiotic use by month from 2000 to 2006 is shown in figure 1. The usual

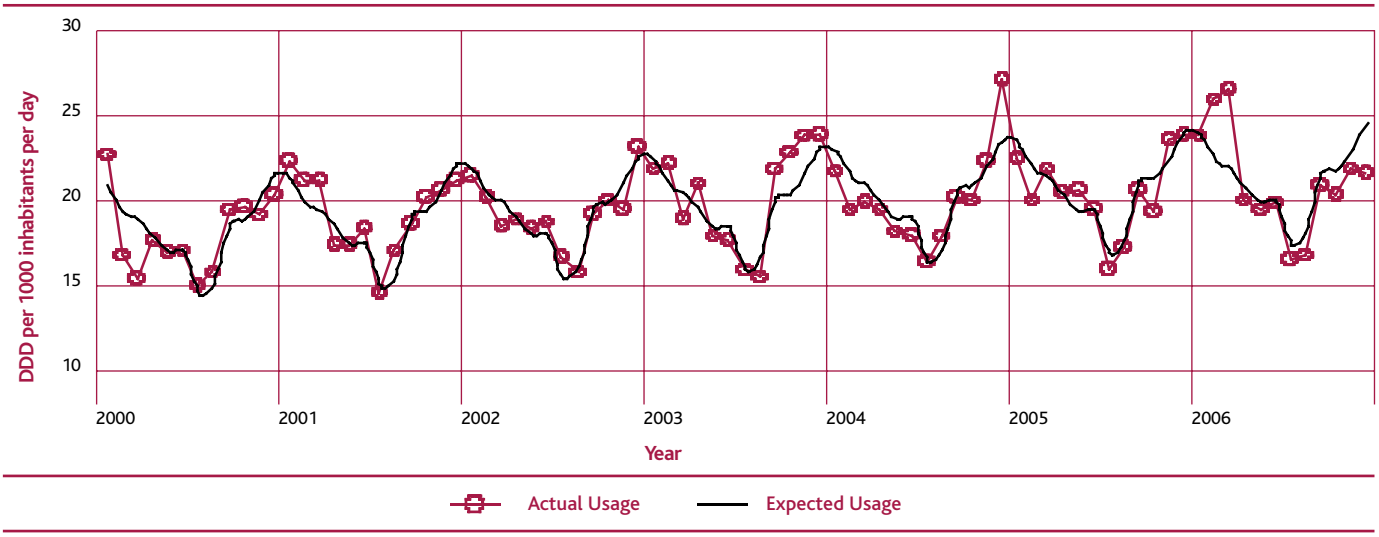

Figure 1. Outpatient antibiotic consumption in Ireland by month, 2000-2006.

seasonal pattern exhibits a decline in usage in the summer months and an increase for the winter months. The average winter usage is usually 27% higher than the summer usage. The overall pattern was the same for 2006 although there were significant differences in three months of 2006 from the expected values. There was higher usage than expected in February and March, and lower usage than expected in December.

While the overall antibiotic usage in Ireland is mid-range among European countries, strong seasonal fluctuations, over-reliance on broad-spectrum antibiotics and high density usage in some regions are factors that may work together to increase the pressure for selection of resistant variants of bacterial pathogens.

Hospital Antibiotic Consumption

In a survey of all public acute hospitals in Ireland, 33 hospitals provided valid antibiotic usage data for 2006. The median rate of antibiotic consumption usage was 93.5 DDD per 100 bed days used (DBD) (inter-quartile range 80.0 – 100.6 DBD). The sample of 33 hospitals represents 72% of total public acute hospital activity in Ireland. The overall hospital antibiotic consumption is therefore estimated to be 2.2 DID. In another ESAC report of 2002 data of 14 European countries, the lowest hospital antibiotic consumption was 1.3 DID in Norway and Sweden and the highest was 3.9 DID in Finland and France, thus hospital antibiotic usage in Ireland is mid-range in Europe.

The figures presented in this report may vary from previously published levels owing to methodological changes.

A more detailed report is available at www.hpsc.ie, under the disease name in Topics A-Z.

EU information is available at www.esac.ua.ac.be

9.2 Antimicrobial Resistance

Summary

- There were 1,399 reports of *S. aureus* bacteraemia submitted to the European Antimicrobial Resistance Surveillance System (EARSS), of which 588 (42.0%) were meticillin-resistant *S. aureus* (MRSA). Both the proportion and rate of MRSA bacteraemia have remained stable at approximately 42% and 0.15 per 1,000 patient bed days used, respectively, over the past 3 years

  There were two reports of vancomycin-intermediate S. *aureus* (VISA), the first reports of VISA in Ireland

- There were 407 reports of invasive *S. pneumoniae* infection resulting in a rate of 9.8 per 100,000 population compared to 401 cases and a rate of 9.7 in 2005

  The proportion of penicillin-non-susceptible *S. pneumoniae* (PNSP) has increased significantly over the past three years from 10.3% in 2004 to 15.7% in 2006

- There were 265 reports of *E. faecium* bacteraemia, of which 37.1% were vancomycin-resistant *E. faecium* (VREfm) and 25.6% were multi-drug resistant (MDR)

- There were 1,656 reports of invasive *E. coli* infection, of which 21.5% were ciprofloxacin-resistant and 9.0% were MDR

- Extended-spectrum beta-lactamases (ESBLs) were reported in 2.8% of *E. coli* and 8.7% of *K. pneumoniae* isolates

- MDR was reported in 11.6% of *K. pneumoniae* and 9.5% of *P. aeruginosa* isolates

Introduction

The European Antimicrobial Resistance Surveillance System (EARSS) in Ireland collects routinely-generated antimicrobial susceptibility testing data on seven important bacterial pathogens using the EARSS case definition: data are to be submitted on the "primary" or first isolate from blood and/or CSF per patient per quarter. As of January 2006, EARSS in Ireland expanded to include two additional pathogens, *Klebsiella pneumoniae* and *Pseudomonas aeruginosa*. In 2006, 42 of 43 laboratories in Ireland participated in EARSS representing coverage of approximately 98% of the Irish population.

Staphylococcus aureus

There were 1,399 reports of *S. aureus* bacteraemia from 1,344 patients, of which 588 (42.0%) were meticillin-resistant *S. aureus* (MRSA) (table 1). The proportion of MRSA in Ireland has been approximately 42% for the past four years (figure 1). In 2006, Ireland still had one of the highest proportions of MRSA in Europe (see http://www.rivm.nl/earss/database/ for European data, including EARSS maps).

Two MRSA isolates with reduced susceptibility to vancomycin were detected at the National MRSA Reference Laboratory by the Etest® macromethod with values of 12mg/L. Both isolates also had vancomycin minimum inhibitory concentrations (MICs) of 4mg/L, by which they were classified as vancomycin-intermediate *S. aureus* (VISA) according to the latest CLSI guidelines. Both were confirmed as VISA by the Centers for Disease Control (CDC), Atlanta. These are the first reports of VISA in Ireland.

The MRSA rate in acute public hospitals only was 0.15 per 1,000 patient bed days used (calculated using acute public hospital activity data from the National Hospitals Office at the Health Services Executive). The MRSA rate has been steady at 0.15 per 1,000 patient days for the past three years.

In patients with laboratory-confirmed *S. aureus* bacteraemia, the probability that the infecting organism was MRSA as compared to meticillin-susceptible *S. aureus* (MSSA) was 1.82 greater in patients aged >=65years than in those aged <65 years (Chi^2=82.6, P<0.001).

Males were approximately 1.7-times more likely to get an invasive *S. aureus* infection (either MRSA or MSSA)

than females (z=9.472, P<0.001). The frequency of invasive *S. aureus* infection increased with age with the majority of infections (n=1043; 75%) occurring in adults over 50 years. The median age for patients with an MRSA infection was 73 years (95%CI, 71-74) while the median age for patients with MSSA was 60 years (95%CI, 58-62). As the confidence intervals do not overlap, this is considered to be a significant difference.

Streptococcus pneumoniae

There were 407 reports of invasive *S. pneumoniae* infection (403 from blood and 4 from CSF) from 406 patients, of which 64 (15.7%) were penicillin-non-susceptible *S. pneumoniae* (PNSP) (table 1). The proportion of PNSP in Ireland has increased significantly over the past three years from 10.3% in 2004 (Chi^2_{trend}=5.5, P=0.019) (figure 2). Sixty-three (16.1%) of 392 isolates were resistant to erythromycin, which was an increase from 12.1% in 2005. In 2006, the highest proportions of PNSP were seen in Southern and the lowest in Northern Europe with moderately high levels in Ireland. Erythromycin resistance was at moderately high levels in most countries, including Ireland. Of the 64 PNSP isolates, 48 were intermediately-resistant (Int; MIC=0.1-1.0mg/L) and 12 were high-level resistant (HLR; MIC >1.0mg/L) to penicillin. No penicillin MICs were available for four non-susceptible (NS) isolates.

Of isolates tested against both penicillin and erythromycin (n=393), 29 (7.4%) were simultaneously PNSP (20 Int, 6 HLR, 3 NS) and erythromycin-resistant. Serotype data were available on 60 pneumococcal isolates from five laboratories only (of 42 reporting to EARSS in 2006). Overall, 59 (98%) and 33 (55%) of 60 isolates belonged to serotypes covered by the pneumococcal polysaccharide (PPV-23; target population: adults ≥65 years and at risk groups) and conjugate (PCV-7; target population: children <2 years) vaccines, respectively. From adults ≥65 years, 20 of 21 (95%) isolates would be covered by PPV-23, while from children <2 years, 11 of 14 (79%) isolates would be

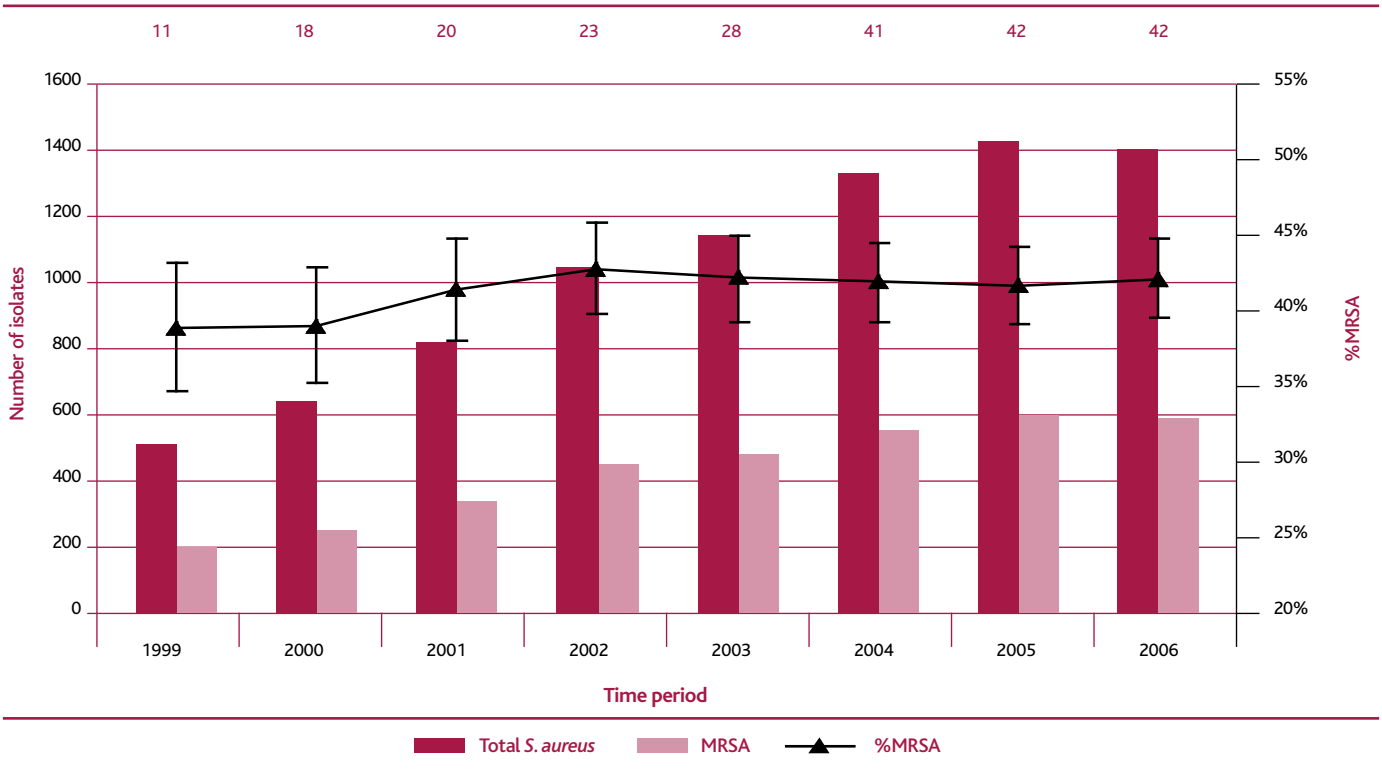

Figure 1. Trends for S. aureus – total numbers of S. aureus/MRSA and percentage MRSA with 95% confidence intervals. The numbers of participating laboratories by year-end are indicated above the bars

Table 1. Summary of EARSS data by pathogen and year

Pathogen	Year 1999	2000	2001	2002	2003	2004	2005	2006
No. laboratories by year-end	**12**	**19**	**20**	**23**	**28**	**41**	**42**	**42**
S. aureus								
Number of isolates	510	639	815	1042	1140	1323	1424	1399
Number Meticillin-R (or MRSA)	198	249	337	445	480	553	592	588
Meticillin-R (or MRSA)	38.8%	39.0%	41.3%	42.7%	42.1%	41.8%	41.6%	42.0%
Number VISA	0	0	0	0	0	0	0	2
VISA*	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
S. pneumoniae								
Number of isolates	157	201	245	278	364	400	401	407
Penicillin-NS	19.1%	12.9%	12.2%	11.5%	11.8%	10.3%	11.7%	15.7%
Erythromycin-R*	13.4%	12.0%	12.6%	12.7%	11.6%	14.2%	12.1%	16.1%
E. faecalis								
Number of isolates	No data	No data	No data	168	218	242	290	294
Ampicillin-R*				8.1%	5.3%	0.8%	3.5%	4.5%
Vancomycin-R				2.4%	1.4%	1.3%	2.5%	3.7%
HLG-R*				39.2%	34.1%	42.2%	43.1%	42.4%
E. faecium								
Number of isolates	No data	No data	No data	85	135	187	224	265
Ampicillin-R*				88.9%	91.0%	95.7%	92.8%	93.9%
Vancomycin-R				11.1%	19.4%	23.2%	31.7%	37.1%
HLG-R*				16.7%	54.7%	57.8%	50.5%	44.3%
MDR*				3.6%	12.4%	19.0%	25.6%	25.6%
E. coli								
Number of isolates	No data	No data	No data	741	991	1256	1445	1656
Ampicillin-R*				62.2%	61.9%	65.0%	67.6%	70.7%
3GC-R*				3.0%	2.4%	2.4%	4.1%	4.2%
Ciprofloxacin-R*				5.4%	9.5%	12.5%	17.4%	21.5%
Gentamicin-R*				2.7%	3.9%	5.7%	8.5%	7.7%
ESBL-producers*				2.2%	1.9%	1.3%	2.6%	2.8%
MDR*				2.4%	3.6%	5.6%	7.6%	9.0%
No. laboratories by year end								**36**
K. pneumoniae								
Number of isolates	No data	No data	No data	No data	No data	No data	No data	217
Ampicillin-R*								97.7%
3GC-R*								9.7%
Ciprofloxacin-R*								16.3%
Gentamicin-R*								7.8%
ESBL-producers*								8.7%
MDR*								11.6%
P. aeruginosa								
Number of isolates	No data	No data	No data	No data	No data	No data	No data	128
Pipericillin/tazobactam-R*								10.2%
Ceftazidime-R*								10.6%
Imipenem/meropenem-R*								11.8%
Ciprofloxacin-R*								18.1%
Gentamicin-R*								10.2%
MDR*								9.5%

***R**, Resistant; **NS**, Non-Susceptible (includes isolates with intermediate and high-level resistance)*
***MRSA**, Meticillin-Resistant S. aureus; **VISA**, Vancomycin-Intermediate S. aureus*
***HLG**, High-Level Gentamicin; **3GC**, 3rd-Generation Cephalosporin (includes cefotaxime, ceftriaxone, ceftazidime and cefpodoxime); **ESBL**, Extended-Spectrum Beta-Lactamase; **MDR**, Multi-Drug Resistant*
** Not all isolates tested*

covered by PCV-7. Of the 10 PNSP isolates for which serotype data were available, five belonged to serotype 9V (4 Int, 1 HLR), four to serotype 6B (all Int) and one to serotype 14 (Int), all of which would be covered by both PPV-23 and PCV-7. Five of these were from adults >65 years while three were from children <2 years.

The rate of invasive pneumococcal disease (IPD) in Ireland in 2006 was estimated to be 9.8 per 100,000 population compared with 9.7 in 2005 (note: both calculated using the 2006 census data and an estimated coverage of 98% of the Irish population by EARSS). The highest rates of IPD were observed in children <1 year (49.1 per 100,000) and adults aged 75-79 years (40) and adults >80 years (70).

Males were approximately 1.3-times more likely to have an invasive *S. pneumoniae* infection than females (z=2.399, P=0.02), however females were approximately 1.4-times more likely to get an invasive PNSP infection than males but this was not significant (z=-1.266, P=0.2). The frequency of invasive *S. pneumoniae* infection was highest in children aged <1 year (n=30; 7.3%) and 1-4 years (n=31, 7.6%) and in adults aged ≥40 years (n=277; 58%). Adults aged ≥65 years accounted for 42% (n=171) of isolates. The median age was 58 years (95%CI, 54-63).

Enterococcus faecalis

There were 294 reports of *E. faecalis* bacteraemia from 291 patients, of which 3.7% were vancomycin-resistant *E. faecalis* (VREfa). Although this proportion was low, Ireland still had one of the highest proportions of VREfa in Europe in 2006. See Table 1 for the annual proportions of *E. faecalis* isolates resistant to the three indicator antibiotics (ampicillin, vancomycin and high-level gentamicin) by year since 2002 when surveillance began.

Thirteen isolates were ampicillin-resistant, which suggests that these isolates were either misidentified as *E. faecalis* or misclassified as ampicillin-resistant as resistance to ampicillin is rare in *E. faecalis*.
Males were approximately 1.6-times more likely to have an invasive *E. faecalis* infection than females (z=4.275, P<0.0001). The frequency of invasive *E. faecalis* infection increased with age with the majority of infections (n=235; 80%) occurring in adults over 50 years. The median age was 68 years (95%CI, 65-72).

Enterococcus faecium

There were 265 reports of *E. faecium* bacteraemia from 259 patients, of which 37.1% were vancomycin-resistant *E. faecium* (VREfm). The proportion of isolates that were VREfm has increased significantly (Chi^2_{trend}=30.00; P<0.001) over the five years for which surveillance has been undertaken (figure 3). On average, the proportion of VREfm isolates increased by approximately 6.4% for each successive year. In 2006, Ireland had one of the highest proportions of VREfm in Europe. See Table 1 for the annual proportions of *E. faecium* isolates resistant to the three indicator antibiotics (as for *E. faecalis* above) by year.

Of 246 isolates tested against all three indicator antibiotics, 63 (25.6%) were resistant to all three and therefore classed as MDR. The proportion of isolates that are MDR has increased significantly (Chi^2_{trend}=19.15, P<0.0001) from 3.6% in 2002. On average, the proportion of MDR *E. faecium* isolates increased by approximately 6% for each successive year, however, no increase was observed between 2005 and 2006.
Males were approximately 1.4-times more likely to have

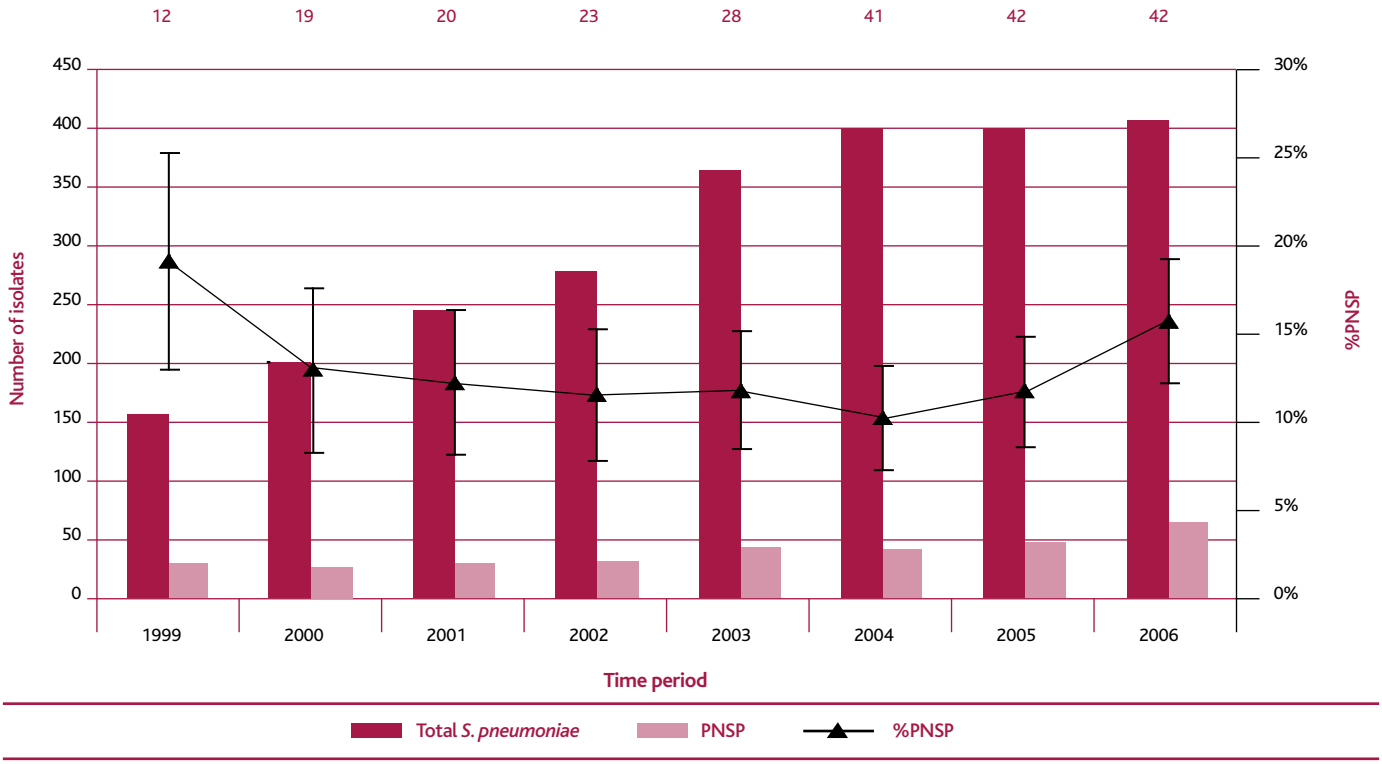

Figure 2. Trends for S. pneumoniae – total numbers of S. pneumoniae/PNSP and percentage PNSP with 95% confidence intervals. The numbers of participating laboratories by year-end are indicated above the bars

an invasive *E. faecium* infection than females (z=2.934, P=0.003). The frequency of invasive *E. faecium* infection increased with age with the majority of infections (n=210; 79%) occurring in adults over 50 years. The median age was 66 years (95%CI, 64-69).

Escherichia coli

There were 1,656 reports of invasive *E. coli* infection (1,649 from blood and 7 from CSF) from 1,638 patients, of which 21.5% were resistant to ciprofloxacin. The proportion of isolates that are ciprofloxacin-resistant has increased significantly (Chi^2_{trend}=142.652, P<0.0001) from 5.4% when surveillance began in 2002 (figure 4). On average, the proportion of ciprofloxacin-resistant *E. coli* isolates increased by approximately 4% for each successive year. See table 1 for the proportion of *E. coli* isolates resistant to the four indicator antibiotics/antibiotic classes [ampicillin, third-generation cephalosporins (3GCs; cefotaxime, ceftriaxone, ceftazidime or cefpodoxime), fluoroquinolones (ciprofloxacin or ofloxacin) and aminoglycosides (gentamicin or tobramycin)] by year. In 2006, fluoroquinolone- (or ciprofloxacin-) resistance was at moderately high levels in Ireland compared to other European countries, while resistance to 3GCs and aminoglycosides was low and moderately low, respectively.

Of 1,246 isolates tested, extended spectrum beta-lactamases (ESBLs) were detected in 35 (2.8%) of isolates. ESBLs are enzymes that confer resistance to most penicillins and cephalosporins (including 3GCs). ESBL-producing bacteria (including *K. pneumoniae* and, increasingly, *E. coli*) are often resistant to other classes of antibiotics and have emerged as important causes of infections in hospitals. No significant increase in ESBL-producing *E. coli* has been observed from invasive infections in Ireland to date.

Of 1,622 isolates tested against all four indicator antibiotics/classes, 146 (9.0%) were identified as MDR: 15 with resistance to all four; 96 with resistance

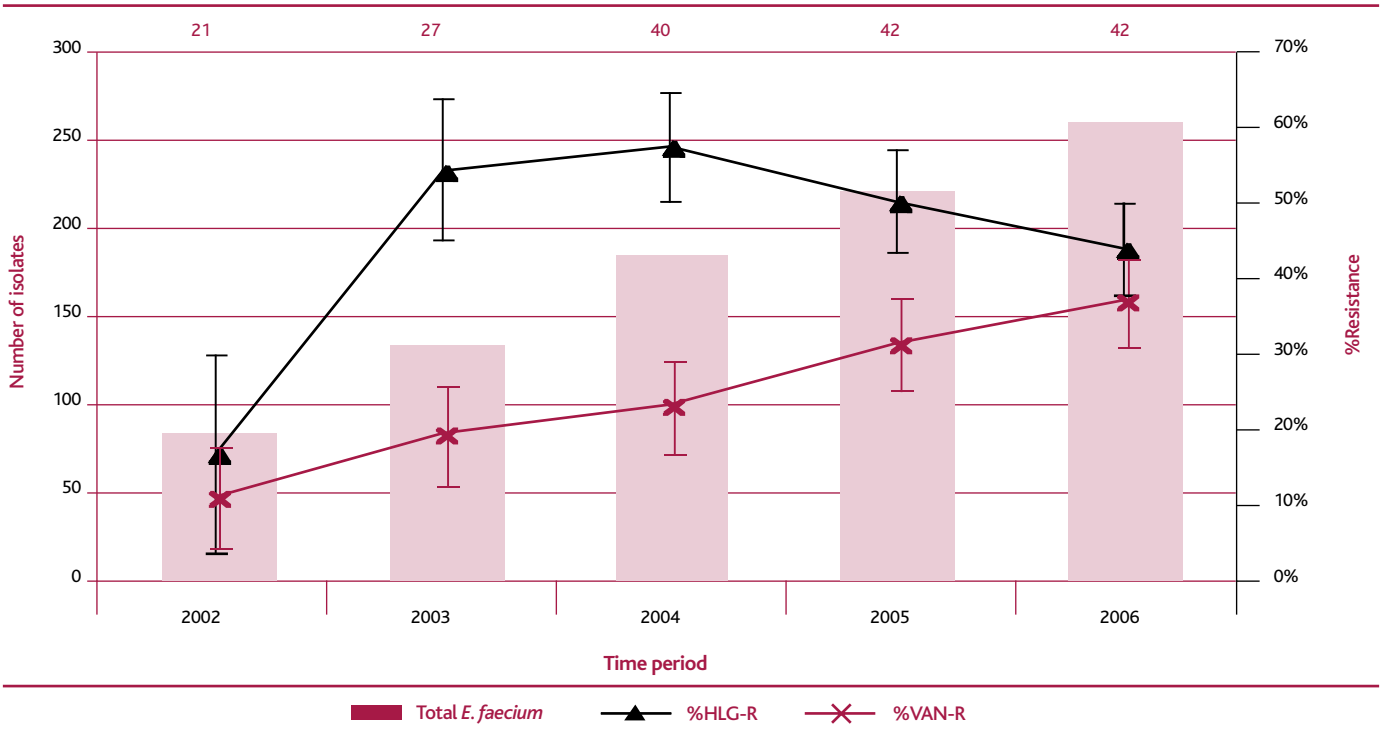

Figure 3. Trends for E. faecium – total numbers of E. faecium and percentage resistance to high-level gentamicin (HLG) and vancomycin (VAN) with 95% confidence intervals.
The numbers of participating laboratories by year-end are indicated above the bars

to ampicillin, ciprofloxacin and gentamicin; 34 with resistance to ampicillin, 3GCs and ciprofloxacin; and one with resistance to ampicillin, 3GCs and gentamicin. The proportion of isolates that are MDR has increased significantly (Chi^2_{trend} =55.142, P<0.0001) from 2.4% when surveillance began in 2002. On average, the proportion of MDR *E. coli* isolates increased by approximately 1.7% for each successive year. Females were approximately 1.29-times more likely to have an invasive *E. coli* infection than males (z=5.219, P<0.0001). The frequency of invasive *E. coli* infection increased with age with the majority of infections (n=1241; 75%) occurring in adults over 55 years. The median age was 71 years (95%CI, 70-72).

Klebsiella pneumoniae

There were 128 reports of invasive *K. pneumoniae* infection (all from blood) from 211 patients (with 36 of 43 laboratories participating in this surveillance activity). See Table 1 for the proportion of *K. pneumoniae* isolates resistant to the four indicator antibiotics/ antibiotic classes (as for *E. coli* above) in 2006. It is too early to comment on trends as data have only been collected for one year.

Five isolates were ampicillin-susceptible, which either represent isolates misidentified as *K. pneumoniae* or misclassified as ampicillin-susceptible as all klebsiellae are inherently resistant to this antibiotic.
ESBLs were detected in 11 (8.7%) of 126 isolates tested. Twenty-three, or 11.6%, of 198 isolates tested against all four indicator antibiotics/classes were identified as MDR: three with resistance to all four; nine with resistance to ampicillin, 3GCs and ciprofloxacin; and 11 with resistance to ampicillin, ciprofloxacin and gentamicin.

Males were approximately 1.6-times more likely to have an invasive *K. pneumoniae* infection than females (z=3.432, P=0.0007). The frequency of invasive *K. pneumoniae* infection increased with age with the majority of infections (n=162; 75%) occurring in adults over 50 years. The median age was 65 years (95%CI, 62-68).

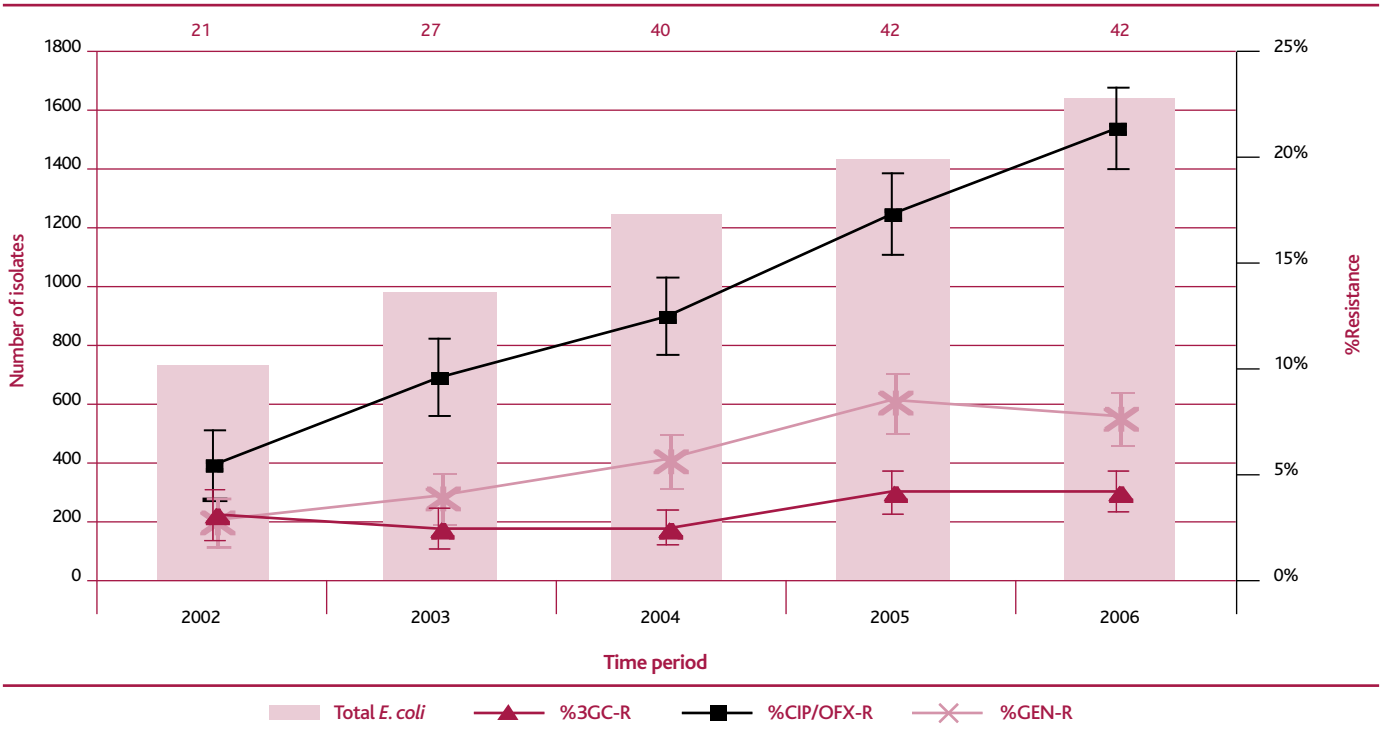

Figure 4. Trends for E. coli – total numbers of E. coli and percentage resistance to 3GCs, ciprofloxacin/ofloxacin (CIP/OFX) and gentamicin (GEN) with 95% confidence intervals.
The numbers of participating laboratories by year-end are indicated above the bars

Pseudomonas aeruginosa
There were 128 reports of invasive *P. aeruginosa* infection (all from blood) from 128 patients (with 36 of 43 laboratories participating in this surveillance activity). See Table 1 for the proportion of *P. aeruginosa* isolates resistant to the five indicator antibiotics/antibiotic classes [piperacillin-tazobactam, ceftazidime, carbapenems (meropenem or imipenem), fluoroquinolones (ciprofloxacin or ofloxacin) and gentamicin] in 2006. It is too early to comment on trends as data have only been collected for one year. Eleven (9.5%) of 116 isolates tested against all five indicator antibiotics/classes were MDR: four with resistance to piperacillin-tazobactam, ceftazidime, ciprofloxacin and gentamicin; three with resistance to meropenem, ciprofloxacin and gentamicin; and one each with resistance to piperacillin-tazobactam, ceftazidime and meropenem; ceftazidime, meropenem and ciprofloxacin; ceftazidime, ciprofloxacin and gentamicin; and piperacillin-tazobactam, ciprofloxacin and gentamicin.

Males were approximately 1.3-times more likely to have an invasive *P. aeruginosa* infection than females (z=1.535, P=0.124) but due to the low number of isolates this was not significant. The frequency of invasive *P. aeruginosa* infection increased with age with the majority of infections (n=90; 70%) occurring in adults over 60 years. The median age was 69 years (95%CI, 64-73).

Conclusion
Antimicrobial resistance (AMR) continues to be a major public health challenge in Ireland. Significant increases in the proportions of PNSP (now at 15.7%), VREfm (37.1%) and ciprofloxacin-resistance in *E. coli* (21.5%) have been observed over the past three to four years, while the proportion of MRSA has remained stable, albeit high, at approximately 42% for the past four years. MDR is also a growing problem among *E. coli* and *E. faecium* accounting for 9.0% and 25.6% of isolates, respectively, in 2006 and significant increases year-on-year since surveillance began in 2002. In 2006, the first two isolates of vancomycin-intermediate *S. aureus* (VISA) were reported. AMR surveillance in two other key pathogens, *K. pneumoniae* and *P. aeruginosa*, commenced in 2006 and the data reported after just one year indicates that resistance levels to most of the commonly used antibiotics is already at 8-12% and even higher for ciprofloxacin at over 16.3% and 18.1%, respectively. In addition, MDR already accounts for 11.6% and 9.5% of isolates, respectively, for these pathogens. The data presented here serve to highlight the urgent need for full implementation of the recommendations included in the 2001 Strategy for the control of Antimicrobial Resistance in Ireland (SARI). Healthcare-associated infection (HCAI) and AMR have been identified as priority issues for the HSE, and it is hoped that the recent establishment of the HSE HCAI Governance Committee will result in the necessary interventions needed to reverse the trends summarised in this report.

A more detailed report is available at www.hpsc.ie, under the disease name in Topics A-Z.

EU information is available at www.rivm.nl/earss/database/

9.3 Enhanced EARSS Surveillance

Summary

Number of isolates, 2006: 1252
Number of participating labs: 10
Number of isolates, 2005: 1446

The European Antimicrobial Resistance Surveillance System (EARSS) in Ireland has been enhanced to collect demographic, risk factor and clinical data since 2004. The enhanced programme involves voluntary participation by laboratories who provide data on invasive pathogens causing bloodstream infections (BSI).

There were 1252 records of individual isolates, or cases under the EARSS definition, submitted from ten laboratories. This figure is down from 1446 in 2005 due to resource issues arising in two of the laboratories. However, the total number of records in 2006 represents 29% of the total core EARSS dataset.

Demographic and other basic data for the major resistance profiles of EARSS pathogens are shown in table 1. These and clinical features of the BSI are detailed in the rest of this section. Note that each patient may have more than one risk factor reported. Malignancies were noted in 17% and immunosuppression in 9% of all BSI, and these two risk factors are not mentioned again in relation to specific pathogens here.

There were 393 records for *Staphylococcus aureus*, 180 (46%) of which were meticillin-resistance *S. aureus* (MRSA) and 213 were meticillin-sensitive *S. aureus* (MSSA). The majority of MRSA isolates (65%) were in those aged 65 or older. Common sources of the MRSA BSI were central venous catheter (CVC, 30%), skin/soft tissue (20%) and respiratory tract infections (16%). Recent surgery (13%) and stay in intensive care unit (ICU stay, 12%) were risk factors specific to MRSA. The majority of MSSA BSI (57%) were detected <48 hours after admission, meaning a large proportion were probably community-acquired. The common origins of MSSA BSI were CVC (45%), and skin/soft tissue infections (22%). The most common risk factor specific to MSSA was haemodialysis (13%) and 3% had endocarditis.

Table 1. Age and gender breakdown by organisms with their major resistance profiles. Number of isolates detected (based on specimen date) <48 hours and >5 days post-admission is also shown. See text for abbreviations.

	Total Number of isolates in 2006	Percent Female	Mean age in years	Number <5 years old	Number 65 years or older	Detected <48hrs after admission	Detected >5days after admission
MRSA	180	42%	68.8	1%	65%	36%	55%
MSSA	213	33%	52.3	8%	40%	57%	30%
PNSP	21	80%	47.0	33%	43%	86%	14%
PSSP	117	39%	46.1	21%	33%	87%	11%
FQREC	113	48%	69.9	0%	68%	43%	52%
FQSEC	344	58%	62.0	5%	58%	69%	27%
VRE	31	16%	65.1	0%	61%	23%	77%
VSE	124	44%	59.7	7%	51%	34%	55%
KPN	72	42%	56.5	6%	38%	34%	59%
PAE	37	49%	66.5	0%	57%	44%	50%

Of the 138 records for *Streptococcus pneumoniae* BSI, 87% were isolated <48 hours after admission showing that these infections were mainly community-acquired. They tended to occur in younger patients (mean age 46.2 year, compared to a mean age of 60 years for all other pathogens), reflecting the bimodal age distribution of *S. pneumoniae* BSI (see Table 1). The vast majority (97%) originated from respiratory tract infections. Of note was the proportion of female patients affected (80%) among penicillin non-susceptible *S. pneumoniae* (PNSP) BSI as compared to susceptible *S. pneumoniae* (PSSP) BSI which generally affected fewer female patients (39%).

There were 457 records for *Escherichia coli*, 113 (25%) of which were fluoroquinolone-resistant *E. coli* (FQREC) and 344 were fluoroquinolone-sensitive *E. coli* (FQSEC). The majority of patients were 65 years or over (68% FQREC and 58% FQSEC). Urinary tract infections (44% FQREC and 58% FQSEC) and gastrointestinal tract infections (22% FQREC and 20% FQSEC) were common sources for these BSI. Urinary catheter was also a common source for FQREC BSI (13%), but only in 5% of FQSEC BSI.

There were 155 enterococcal BSI records, 78 *Enterococcus faecalis* and 77 *E. faecium*. Of the enterococci BSI, 31 (20%) were vancomycin-resistant enterococci (VRE) and 124 vancomycin-sensitive enterococci (VSE). VRE BSI occurred less frequently in females (16%) than VSE BSI (44%). VRE BSI were associated with longer stay in hospital (77% detected >5 days after admission). CVC were a common source for these BSI (56% VRE and 39% VSE), followed by gastro-intestinal tract (17% VRE and 35% VSE). Common pathogen-specific risk factors were ICU stay (32% VRE and 21% VSE) and recent surgery (10% VRE and 22% VSE).

There were 72 records for *Klebsiella pneumoniae* (KPN) BSI, originating mainly from gastro-intestinal tract sources (30%), CVC (26%), respiratory tract (18%) and urinary tract infections (16%). Common risk factors specific for KPN BSI were recent surgery (17%) and ICU stay (13%). There were 37 records for *Pseudomonas aeruginosa* (PNE) BSI, originating mainly from CVC, respiratory tract and urinary tract infection (21% each), and non-surgical wounds and skin/soft tissue infections (13% each). Common risk factors specific for PNE BSI were recent surgery and ICU stay (14% each). KPN and PNE are recent additions to EARSS and analysis of factors associated with their major resistance profiles will be possible when data from several years are combined.

A more detailed report is available at www.hpsc.ie, under the disease name in Topics A-Z.

10

Computerised Infectious Disease Reporting System (CIDR)

10. Computerised Infectious Disease Reporting System (CIDR)

Summary

Population coverage (Public Health), 80% *
Population coverage (Laboratory Service),33% *
No. of CIDR users: 200
No. of CIDR events: 11204

* Using CIDR directly

2006 saw a continuation of the national rollout of CIDR that commenced at the beginning of 2005 (see figure 1). CIDR was implemented in the Public Health Departments in the former North West Health Board and Eastern Regional Health Authority regions. CIDR also went live in three laboratories in 2006. Two of the laboratories were in Cork, the Mercy Hospital and the Bon Secours Hospital, the third hospital, St. James's, is in Dublin. The number of CIDR users at the end of 2006 exceeded 200.

Reports continue to remain a key feature of the CIDR system, enabling users to view and analyse data in a user-friendly manner as soon as it is entered into the system. The number of report templates that are available to CIDR users to facilitate access to data continued to increase significantly through 2006 with an additional 20 report templates added to the existing 67. In addition 29 of the existing reports were updated during the year to better meet users' needs.

CIDR has enabled the use of a more streamlined process for the validation and cleaning of notification data by users. A suite of validation reports are now available on the system which users can routinely run to help identify discrepancies or gaps in the data recorded and then make the necessary updates, thereby improving the quality and completeness of the data.

The CIDR helpdesk continued to provide first line support for CIDR users in relation to business and technical problems associated with the use of CIDR. Simple or routine helpdesk calls can be resolved at first level support whilst more complex problems may need to be referred to second line support. Occasionally complex business helpdesk calls may need to be escalated to the disease-specific teams within HPSC and national working groups. Likewise complex technical helpdesk calls may need to addressed in conjunction with local ICT support or to be referred to the CIDR technical support partner.

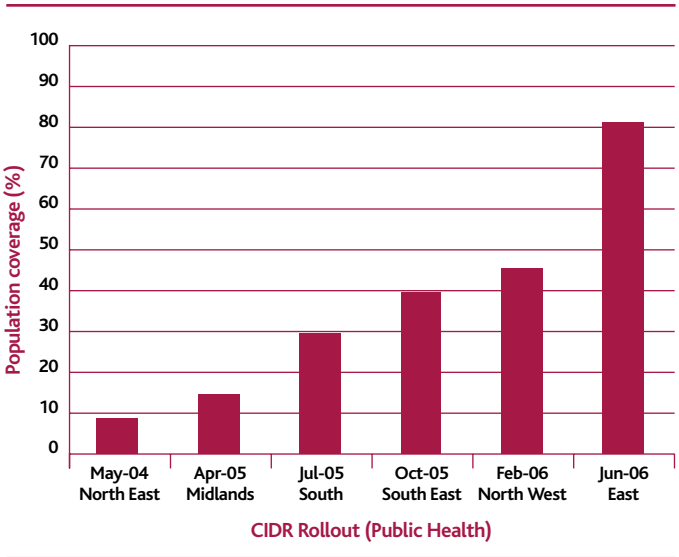

Figure 1. Population coverage of CIDR following implementation in HSE Public Health Departments, by month and year

The increased activity associated with CIDR and the increased number of CIDR users through 2006 was accompanied by a significant increase in the number of calls to the helpdesk compared with 2005 (see table 1). Analysis of calls clearly identified reporting as the most common subject for calls to the helpdesk in 2006, underlining the importance of the reporting functionality in CIDR. Problems with logging on to the CIDR system were the next most frequent reason for calling the helpdesk. These logon problems were primarily associated with new users needing their accounts to be activated.

The delivery of CIDR training to new users was a major activity throughout 2006. There were eighteen two-day CIDR courses delivered to Public Health users and six one-day CIDR courses for laboratory users.

Another significant development through 2006 was the CIDR User Group established at the end of 2005. This group met on four occasions through 2006 and has developed into a valuable communications tools between CIDR users and the CIDR administration team but has also established a useful forum for identifying best practices around the country.

The restructuring of the Health Service and the establishment of the Health Service Executive (HSE) since January 1st 2005 meant that the CIDR Project Board needed to be re-established to take account of new structures and responsibilities. Dr. Dick Nolan from the Department of Health and Dr. Orlaith O'Reilly from Public Health in the South East retired from the Board in 2006. The CIDR team wishes to acknowledge the crucial role played by both through the design, development and initial implementation phases of CIDR. Two new members were welcomed to the Board, now renamed the CIDR National Steering Committee. Dr. Kevin Kelleher and Mr. Dougie Beaton joined the Committee on behalf of the Population Health Directorate of HSE.

International interest in CIDR as an innovative infectious disease information system continued through 2006 and was demonstrated through a visit from staff from the European Centre for Disease Prevention and Control (ECDC). During this visit the experts from the Surveillance and Communications Unit discussed CIDR technical details and implementation experience in preparation for the development and implementation of a similar system for ECDC. A CIDR presentation at the 4th Annual Public Health Information Network (PHIN) in Atlanta in the US engendered considerable interest and

Table 1. The increase in CIDR business and technical helpdesk calls from 2005 to 2006.

	Business Helpdesk Calls	Technical Helpdesk Calls	Total Helpdesk Calls
2005	268	347	**615**
2006	369	593	**962**

active discussion. CIDR was also demonstrated at the inaugural All-Ireland Health Intelligence Conference in Dublin.

Other CIDR activities during 2006 included the maintenance of IS 17799 certification for Information Security Management to ensure that we continued to meet our legal responsibilities in relation to data protection and also to reassure CIDR users and ultimately CIDR data subjects that appropriate processes and procedures were in place to ensure data was adequately protected and only accessible by the relevant people.

Preliminary work was initiated in relation to identifying the user requirements for an information system to manage data relating to contacts of cases of infectious disease. This work included a review of information systems used elsewhere such as the US CDC Outbreak Management System (OMS), the UK HPA interim Avian Influenza Database (AIDB) and the UK HPZone system. A Contact Tracing Development group has been established to help to identify the full set of user requirements for a system in Ireland compatible with CIDR.

The existing CIDR hardware and software needs to be replaced by the beginning of 2008 to ensure these continue to be supported by the relevant suppliers. The new versions of software were reviewed to determine how they might be best utilised in replacement CIDR systems and a draft plan prepared to identify the tasks involved and the time required. Similarly new hardware was specified and purchased at the end of 2006 to allow the new development to commence early in 2007.

11

Appendix 1
Notifiable Infectious Diseases in Ireland

Notes:

Figures presented in this appendix were extracted from the Computerised Infectious Disease Reporting (CIDR) system on the 8th August 2007. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

Figures on EARSS pathogens, tuberculosis, syphilis and other sexually transmitted infections are not presented here. Separate databases are used to collate data on these diseases. Details on the epidemiology of these diseases can be found in separate chapters in this document.

Table A1.1 List of notifiable infectious diseases and their respective causative pathogens under Infectious Diseases (Amendment) (No. 3) Regulations 2003 (S.I. No. 707 of 2003)

Infectious Disease	Causative Pathogen(s)
Acute anterior poliomyelitis	Polio virus
Acute infectious gastroenteritis	
Ano-genital warts	
Anthrax	*Bacillus anthracis*
Bacillus cereus food-borne infection/intoxication	*Bacillus cereus*
Bacterial meningitis (not otherwise specified)	
Botulism	*Clostridium botulinum*
Brucellosis	*Brucella* species
Campylobacter infection	*Campylobacter* species
Chancroid	*Haemophilus ducreyi*
Chlamydia trachomatis infection (genital)	*Chlamydia trachomatis*
Cholera	*Vibrio cholerae*
Clostridium perfringens (type A) food-borne disease	*Clostridium perfringens*
Creutzfeldt Jakob disease	
Creutzfeldt Jakob disease (new variant)	
Cryptosporidiosis	*Cryptosporidium parvum*
Diphtheria	*Corynebacterium diphtheriae*
Echinococcosis	*Echinococcus* species
Enterococcal bacteraemia	*Enterococcus* species (blood)
Enterohaemorrhagic *Escherichia coli*	*Escherichia coli* of serogroup known to be toxin-producing
Escherichia coli infection (invasive)	*Escherichia coli* (blood, CSF)
Giardiasis	*Giardia lamblia*
Gonorrhoea	*Neisseria gonorrhoeae*
Granuloma inguinale	
Haemophilus influenzae disease (invasive)	*Haemophilus influenzae* (blood, CSF or other normally sterile site)
Hepatitis A (acute)	Hepatitis A virus
Hepatitis B (acute and chronic)	Hepatitis B virus
Hepatitis C	Hepatitis C virus
Herpes simplex (genital)	Herpes simplex virus
Influenza	Influenza A and B virus
Legionellosis	*Legionella* species
Leptospirosis	*Leptospira* species
Listeriosis	*Listeria monocytogenes*
Lymphogranuloma venereum	
Malaria	*Plasmodium falciparum, P. vivax, P. ovale, P. malariae*
Measles	Measles virus
Meningococcal disease	*Neisseria meningitidis*
Mumps	Mumps virus
Non-specific urethritis	
Noroviral infection	Norovirus
Paratyphoid	*Salmonella paratyphi*
Pertussis	*Bordetella pertussis*
Plague	*Yersinia pestis*
Q fever	*Coxiella burnetii*
Rabies	Rabies virus
Rubella	Rubella virus

Table A1.1 (continued) List of notifiable infectious diseases and their respective causative pathogens under Infectious Diseases (Amendment) (No. 3) Regulations 2003 (S.I. No. 707 of 2003)

Infectious Disease	Causative Pathogen(s)
Salmonellosis	*Salmonella enterica*
Severe Acute Respiratory Syndrome (SARS)	SARS-associated coronavirus
Shigellosis	*Shigella* species
Smallpox	Variola virus
Staphylococcal food poisoning	Enterotoxigenic *Staphylococcus aureus*
Staphylococcus aureus bacteraemia	*Staphylococcus aureus* (blood)
Streptococcus group A infection (invasive)	*Streptococcus pyogenes* (blood, CSF or other normally sterile site)
Streptococcus pneumoniae infection (invasive)	*Streptococcus pneumoniae* (blood, CSF or other normally sterile site)
Syphilis	*Treponema pallidum*
Tetanus	*Clostridium tetani*
Toxoplasmosis	*Toxoplasma gondii*
Trichinosis	*Trichinella* species
Trichomoniasis	*Trichomonas* vaginalis
Tuberculosis	*Mycobacterium tuberculosis* complex
Tularemia	*Francisella tularensis*
Typhoid	*Salmonella typhi*
Typhus	*Rickettsia prowazekii*
Viral encephalitis	
Viral haemorrhagic fevers	Lassa virus, Marburg virus, Ebola virus, Crimean-Congo haemorrhagic fever virus
Viral meningitis	
Yellow fever	Yellow fever virus
Yersiniosis	*Yersinia enterocolitica, Yersinia pseudotuberculosis*

Table A1.2 Number of notifiable infectious diseases, 2004-2006 and crude incidence rates of diseases, 2006

Infectious Disease	2004	2005	2006	CIR* 2006
Acute anterior poliomyelitis	0	0	0	0.00
Acute infectious gastroenteritis	1898	2402	2306	54.39
Anthrax	0	0	0	0.00
Bacillus cereus food-borne infection or intoxication	1	0	0	0.00
Bacterial meningitis (not otherwise specified)	36	30	46	1.08
Botulism	0	0	1	0.02
Brucellosis	60	53	29	0.68
Campylobacter infection	1710	1801	1815	42.81
Cholera	0	0	0	0.00
Clostridium perfringens (type A) food-borne disease	5	1	0	0.00
Creutzfeldt Jakob disease	4	4	6	0.14
Creutzfeldt Jakob disease (new variant)	0	2	1	0.02
Cryptosporidiosis	431	568	367	8.66
Diphtheria	0	0	0	0.00
Echinococcosis	0	0	0	0.00
Enterohaemorrhagic *Escherichia coli*	67	134	174	4.10
Giardiasis	53	57	65	1.53
Haemophilus influenzae disease (invasive)	38	34	38	0.90
Hepatitis A (acute)	47	56	39	0.92
Hepatitis B (acute and chronic)	720	889	820	19.34
Hepatitis C	1131	1434	1226	28.92
Influenza	79	316	276	6.51
Legionellosis	4	9	13	0.31
Leptospirosis	15	15	20	0.47
Listeriosis	11	12	7	0.17
Malaria	27	44	96	2.26
Measles	330	93	83	1.96
Meningococcal disease	198	203	210	4.95
Mumps	422	1080	426	10.05
Noroviral infection	1125	1052	1639	38.66
Paratyphoid	4	0	1	0.02
Pertussis	92	83	62	1.46
Plague	0	0	0	0.00
Q fever	7	10	12	0.28
Rabies	0	0	0	0.00
Rubella	49	17	14	0.33
Salmonellosis	416	348	422	9.95
Severe Acute Respiratory Syndrome (SARS)	0	0	0	0.00
Shigellosis	56	36	54	1.27
Smallpox	0	0	0	0.00

Table A1.2 (continued) Number of notifiable infectious diseases, 2004-2006 and crude incidence rates of diseases, 2006

Infectious Disease	2004	2005	2006	CIR* 2006
Staphylococcal food poisoning	3	6	0	0.00
Streptococcus group A infection (invasive)	35	49	61	1.44
Streptococcus pneumoniae infection (invasive)	175	271	293	6.91
Tetanus	1	0	0	0.00
Toxoplasmosis	33	47	44	1.04
Trichinosis	0	0	0	0.00
Tularemia	0	0	0	0.00
Typhoid	5	5	9	0.21
Typhus	0	0	0	0.00
Viral encephalitis	5	6	16	0.38
Viral haemorrhagic fevers	0	0	0	0.00
Viral meningitis	23	35	148	3.49
Yellow fever	0	0	0	0.00
Yersiniosis	6	3	1	0.02
Total	**9322**	**11205**	**10840**	**-**

See explanatory note on first page of Appendix 1.
**Crude incidence rate per 100,000 total population.*

Table A1.3 Number of notifiable infectious diseases in 2006 by HSE area

Infectious Disease	HSE-E	HSE-M	HSE-MW	HSE-NE	HSE-NW	HSE-SE	HSE-S	HSE-W	Total
Acute infectious gastroenteritis	656	226	97	116	223	254	422	312	**2306**
Bacterial meningitis (not otherwise specified)	14	2	6	3	0	9	8	4	**46**
Botulism	*	*	*	*	*	*	*	*	**1**
Brucellosis	0	0	24	0	0	2	2	1	**29**
Campylobacter infection	670	127	132	123	105	197	256	205	**1815**
Creutzfeldt Jakob disease	2	0	0	0	1	1	2	0	**6**
Creutzfeldt Jakob disease (new variant)	*	*	*	*	*	*	*	*	**1**
Cryptosporidiosis	7	39	56	28	30	61	74	72	**367**
Enterohaemorrhagic *Escherichia coli*	31	19	21	21	20	9	15	38	**174**
Giardiasis	29	0	8	1	1	6	13	7	**65**
Haemophilus influenzae disease (invasive)	13	1	3	1	5	4	8	3	**38**
Hepatitis A (acute)	14	2	3	2	4	2	9	3	**39**
Hepatitis B (acute and chronic)	483	31	59	59	19	52	69	48	**820**
Hepatitis C	924	50	36	36	22	42	70	46	**1226**
Influenza	75	16	105	9	12	26	21	12	**276**
Legionellosis	8	0	2	2	0	0	0	1	**13**
Leptospirosis	8	1	3	1	1	5	0	1	**20**
Listeriosis	4	0	0	0	2	0	0	1	**7**
Malaria	45	5	3	17	6	4	9	7	**96**
Measles	44	3	7	7	6	5	4	7	**83**
Meningococcal disease	78	12	21	19	11	24	32	13	**210**
Mumps	158	26	25	48	52	20	30	67	**426**
Noroviral infection	538	376	108	82	101	65	275	94	**1639**
Paratyphoid	*	*	*	*	*	*	*	*	**1**
Pertussis	11	13	5	0	4	6	14	9	**62**
Q fever	0	0	4	2	1	0	4	1	**12**
Rubella	5	0	1	1	2	1	2	2	**14**
Salmonellosis	157	36	31	32	38	33	52	43	**422**
Shigellosis	26	4	9	3	0	0	11	1	**54**
Streptococcus group A infection (invasive)	37	2	2	5	1	4	3	7	**61**
Streptococcus pneumoniae infection (invasive)	104	3	21	20	48	70	20	7	**293**
Toxoplasmosis	24	3	7	1	3	1	1	4	**44**
Typhoid	6	0	0	1	0	1	1	0	**9**
Viral encephalitis	8	0	0	2	2	1	1	2	**16**
Viral meningitis	59	7	13	14	16	15	5	19	**148**
Yersiniosis	*	*	*	*	*	*	*	*	**1**

See explanatory note on first page of Appendix 1.
** Data not reported to HSE area level when total number in Ireland <5 cases*

Table A1.4 Number of notifiable infectious diseases in 2006 by age group (years)

Infectious Disease	0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-64	65+	Unknown	Total
Acute infectious gastroenteritis	2115	41	11	8	8	21	17	8	6	50	21	**2306**
Bacterial meningitis (not otherwise specified)	27	0	1	7	3	1	4	0	1	2	0	**46**
Botulism	0	0	0	0	0	0	0	0	0	0	1	**1**
Brucellosis	0	1	0	0	0	2	4	5	11	6	0	**29**
Campylobacter infection	405	113	69	93	179	342	180	147	134	144	9	**1815**
Creutzfeldt Jakob disease	0	0	0	0	0	0	0	0	2	4	0	**6**
Creutzfeldt Jakob disease (new variant)	0	0	0	0	1	0	0	0	0	0	0	**1**
Cryptosporidiosis	231	60	22	16	9	17	3	2	2	5	0	**367**
Enterohaemorrhagic Escherichia coli	72	27	10	6	4	17	19	5	6	8	0	**174**
Giardiasis	16	2	0	2	8	15	12	5	4	1	0	**65**
Haemophilus influenzae disease (invasive)	9	6	0	0	1	0	2	3	5	12	0	**38**
Hepatitis A (acute)	5	5	2	3	3	7	4	3	1	5	1	**39**
Hepatitis B (acute and chronic)	5	4	2	35	133	351	189	60	20	16	5	**820**
Hepatitis C	3	0	3	13	120	540	330	144	41	20	12	**1226**
Influenza	49	16	34	16	11	30	41	37	14	24	4	**276**
Legionellosis	0	0	0	0	0	0	4	6	0	3	0	**13**
Leptospirosis	0	0	0	1	4	5	6	3	0	1	0	**20**
Listeriosis	1	0	0	0	1	0	0	1	0	3	1	**7**
Malaria	15	10	1	1	5	32	24	6	2	0	0	**96**
Measles	71	4	1	1	0	2	1	0	1	0	2	**83**
Meningococcal disease	120	17	11	30	9	4	5	7	2	5	0	**210**
Mumps	33	33	58	99	90	64	20	11	8	8	2	**426**
Noroviral infection	166	14	7	7	16	58	43	69	121	919	219	**1639**
Paratyphoid	0	0	0	0	0	1	0	0	0	0	0	**1**
Pertussis	50	6	3	0	0	0	1	1	1	0	0	**62**
Q fever	1	0	0	0	0	3	2	1	1	4	0	**12**
Rubella	11	1	1	0	0	0	0	1	0	0	0	**14**
Salmonellosis	94	38	16	15	40	70	38	46	29	34	2	**422**
Shigellosis	10	5	2	3	3	18	6	3	3	1	0	**54**
Streptococcus group A infection (invasive)	7	1	4	2	4	9	7	6	5	16	0	**61**
Streptococcus pneumoniae infection (invasive)	57	11	5	8	7	13	23	32	36	100	1	**293**
Toxoplasmosis	8	0	0	2	4	16	6	5	2	1	0	**44**
Typhoid	1	1	1	0	1	3	1	1	0	0	0	**9**
Viral encephalitis	5	1	0	1	0	2	0	1	2	4	0	**16**
Viral meningitis	35	20	15	23	12	25	15	2	1	0	0	**148**
Yersiniosis	0	0	0	1	0	0	0	0	0	0	0	**1**
Total	**3622**	**437**	**279**	**393**	**676**	**1668**	**1007**	**621**	**461**	**1396**	**280**	**10840**

See explanatory note on first page of Appendix 1.

Table A1.5 Number of notifiable infectious diseases in 2006 by gender

Infectious Disease	Male	Female	Unknown	Total
Acute infectious gastroenteritis	1163	1123	20	**2306**
Bacterial meningitis (not otherwise specified)	30	16	0	**46**
Botulism	1	0	0	**1**
Brucellosis	27	2	0	**29**
Campylobacter infection	1001	805	9	**1815**
Creutzfeldt Jakob disease	5	1	0	**6**
Creutzfeldt Jakob disease (new variant)	1	0	0	**1**
Cryptosporidiosis	198	169	0	**367**
Enterohaemorrhagic *Escherichia coli*	89	84	1	**174**
Giardiasis	33	31	1	**65**
Haemophilus influenzae disease (invasive)	22	16	0	**38**
Hepatitis A (acute)	21	17	1	**39**
Hepatitis B (acute and chronic)	442	337	41	**820**
Hepatitis C	790	416	20	**1226**
Influenza	141	132	3	**276**
Legionellosis	8	5	0	**13**
Leptospirosis	20	0	0	**20**
Listeriosis	5	2	0	**7**
Malaria	58	36	2	**96**
Measles	44	38	1	**83**
Meningococcal disease	128	82	0	**210**
Mumps	258	168	0	**426**
Noroviral infection	689	940	10	**1639**
Paratyphoid	0	1	0	**1**
Pertussis	29	33	0	**62**
Q fever	9	3	0	**12**
Rubella	8	6	0	**14**
Salmonellosis	188	232	2	**422**
Shigellosis	26	28	0	**54**
Streptococcus group A infection (invasive)	32	29	0	**61**
Streptococcus pneumoniae infection (invasive)	166	127	0	**293**
Toxoplasmosis	10	34	0	**44**
Typhoid	5	4	0	**9**
Viral encephalitis	8	8	0	**16**
Viral meningitis	90	58	0	**148**
Yersiniosis	0	1	0	**1**
Total	**5745**	**4984**	**111**	**10840**

See explanatory note on first page of Appendix 1.

Table A1.6 Number of notifiable infectious diseases in 2006 by case classification

Infectious Disease	Confirmed	Probable	Possible	Not Specified	Total
Acute infectious gastroenteritis	2112	193	0	1	**2306**
Bacterial meningitis (not otherwise specified)	9	14	23	0	**46**
Botulism	1	0	0	0	**1**
Brucellosis	4	25	0	0	**29**
Campylobacter infection	1812	1	0	2	**1815**
Creutzfeldt Jakob disease	6	0	0	0	**6**
Creutzfeldt Jakob disease (new variant)	1	0	0	0	**1**
Cryptosporidiosis	366	1	0	0	**367**
Enterohaemorrhagic *Escherichia coli*	169	5	0	0	**174**
Giardiasis	65	0	0	0	**65**
Haemophilus influenzae disease (invasive)	38	0	0	0	**38**
Hepatitis A (acute)	38	0	1	0	**39**
Hepatitis B (acute and chronic)	818	0	0	2	**820**
Hepatitis C	1226	0	0	0	**1226**
Influenza	266	0	10	0	**276**
Legionellosis	12	1	0	0	**13**
Leptospirosis	18	0	0	2	**20**
Listeriosis	7	0	0	0	**7**
Malaria	94	0	0	2	**96**
Measles	24	0	55	4	**83**
Meningococcal disease	173	7	30	0	**210**
Mumps	209	45	161	11	**426**
Noroviral infection	1240	399	0	0	**1639**
Paratyphoid	1	0	0	0	**1**
Pertussis	38	5	15	4	**62**
Q fever	8	4	0	0	**12**
Rubella	1	0	12	1	**14**
Salmonellosis	420	2	0	0	**422**
Shigellosis	53	0	0	1	**54**
Streptococcus group A infection (invasive)	61	0	0	0	**61**
Streptococcus pneumoniae infection (invasive)	247	34	12	0	**293**
Toxoplasmosis	42	0	0	2	**44**
Typhoid	8	1	0	0	**9**
Viral encephalitis	16	0	0	0	**16**
Viral meningitis	121	17	0	10	**148**
Yersiniosis	1	0	0	0	**1**
Total	**9725**	**754**	**319**	**42**	**10840**

See explanatory note on first page of Appendix 1.
Case classifications are assigned to notifications as per the Case Definitions for Notifiable Diseases booklet, available at http://www.hpsc.ie
**As per the case definitions, meningococcal disease notifications are classified as definite, presumed and possible.*
For convenience they are reported in this table as confirmed, probable and possible, respectively.

Explanatory Notes
Glossary of Terms

Explanatory Notes

Notifiable Infectious Diseases

Computerised Infectious Disease Reporting (CIDR)

For the majority of the notifiable infectious diseases (see appendix 1), data were collated using the Computerised Infectious Disease Reporting (CIDR) system. Notification data were inputted directly by areas using the system. For areas not yet on CIDR, data were forwarded to HPSC for input to CIDR. Enhanced surveillance was undertaken for certain diseases and these data collated on CIDR. Outbreak data were also collated on CIDR using the same process outlined above. Throughout the year data were cleaned and validated on an ongoing basis and final data checks and cleaning were undertaken following year end by HPSC and the Departments of Public Health. Data analysis was performed using Business Objects Reporting and MS Excel. Figures for the relevant chapters within this report were extracted from CIDR between mid July and mid September 2007. These figures may differ from those previously published due to ongoing updating of data on CIDR.

Data on the notifiable infectious diseases not yet on CIDR were collated as follows:

National Tuberculosis Surveillance System (NTBSS)

TB notification data (including enhanced information) for 2005 were collated in the regional Departments of Public Health, where data were entered on the Epi2000 NTBSS database. Each HSE area provided finalised 2005 data with outcome information to HPSC in early to mid 2007. Data were validated and cleaned with each area and the national data were collated. Provisional 2006 data were obtained from each area in August 2007.

European Antimicrobial Resistance Surveillance (EARRS)

Data were collected by participating EARSS laboratories in 2006 on the first invasive isolate per quarter on *Staphylococcus aureus* and *Enterococcus faecalis* from blood only and on *Streptococcus pneumoniae*, *Escherichia coli*, *Klebsiella pneumoniae* and *Pseudomonas aeruginosa* from blood and cerebrospinal fluid (CSF). Data were reported quarterly to HPSC and collated in the WHONET database. Quarterly and annual reports were produced.

Note: In general, invasive infections due to *K. pneumoniae* and *P. aeruginosa* are not notifiable but these pathogens are now included for surveillance under EARSS.

Sexually Transmitted Infections (STIs)

Clinicians and laboratories notified their respective Departments of Public Health of probable and confirmed cases of STIs in 2005. Notifications were anonymised prior to notification. Data were collated and analysed by Departments of Public Health and aggregated data were reported quarterly to HPSC. National data were collated on an MS Access database, analysis preformed and reports produced by HPSC.

An enhanced surveillance system is in place for syphilis since 2000. Enhanced forms were completed by clinicians and forwarded to the appropriate Department of Public Health from where they were sent to HPSC. An MS Access database was used at HPSC for collation and analysis of the national syphilis case-based data.

Other Surveillance Systems

Influenza Surveillance

A sentinel surveillance system is used in Ireland for the surveillance of influenza activity. For the 2006/2007 influenza season (October to May), 48 geographically distributed general practices participated (representing 4.0% of the population) in collaboration with the ICGP, NVRL, DoHC and HPSC. Each week the participating GPs reported electronically to the ICGP the number of patients who consulted with influenza-like illness (ILI). The NVRL reported to HPSC on a weekly basis the number of influenza positive specimens tested (from sentinel and non-sentinel sources). The Departments of Public Health notified HPSC weekly of all cases of influenza and all influenza/ILI outbreaks. Other indicators of influenza activity reported by the Departments of Public Health to HPSC included a regional influenza activity index, sentinel hospital admission levels, sentinel school absenteeism and enhanced surveillance data on hospitalised cases of influenza in 0-14 year olds. HPSC was notified of all registered deaths on a weekly basis from the General Register Office. At HPSC data were collated from the

various sources and weekly influenza reports were produced. Clinical and virological data were reported weekly to EISS. Following the end of the influenza season, annual data were analysed and reports produced.

HIV
HIV and AIDS surveillance in Ireland is voluntary and anonymsed and operates in co-operation with laboratories, clinicians and Departments of Public Health. In 2006, clinicians completed surveillance forms on newly diagnosed HIV cases, AIDS cases and AIDS related deaths and forwarded these to the appropriate Department of Public Health who in turn forwarded them to HPSC where national data were collated on an MS Access database. Bi-annual analysis of these data were performed at HPSC and reports produced.

Immunisation Uptake
Each HSE area maintains a childhood immunisation register. In 2006, each HSE area provided HPSC with immunisation uptake data on a quarterly basis. National data were collated and analysed at HPSC using MS Excel database. Quarterly and annual reports were produced. For further details on methods used, please see the immunisation uptake chapter within this report.

Denominator Data
To calculate disease incidence rates, Census of Population data were used as the denominator (available from the Central Statistics Office, http://www.cso.ie). Population figures were applied as follows: Census 2006 for analysis of 2004-2006 data, Census 2002 for 2000-2003 data and Census 1996 for 1999 data.

Population size was estimated between 1993 and 2006 for non-census years using a curve interpolation method for the calculation of outpatient antibiotic consumption rates. Bed-days used and other activity data for public acute hospitals were provided by the National Hospital's Office of the HSE and used to calculate rates of MRSA and hospital antibiotic consumption.

HSE areas
Although organisational changes have taken place in the Health Services, the term HSE areas are used in this report when analysing and presenting data by geographical area (equating to the eight former health board regions/areas). This is because operationally the surveillance, prevention and control of infectious diseases are still managed by eight Departments of Public Health, one in each HSE area.

Glossary of Terms

CIDR	Computerised Infectious Diseases Reporting
DoHC	Department of Health and Children
EARSS	European Antimicrobial Surveillance System
EISS	European Influenza Surveillance System
FSAI	Food Safety Authority of Ireland
FSPB	Food Safety Promotion Board
ICGP	Irish College of General Practitioners
IMMRL	Irish Meningococcal and Meningitis Reference Laboratory
HPSC	Health Protection Surveillance Centre
HSE	Health Services Executive
HSE-E	HSE Eastern Region
HSE-M	HSE Midland Area
HSE-MW	HSE Mid Western Area
HSE-NE	HSE North Eastern Area
HSE-NW	HSE North Western Area
HSE-SE	HSE South Eastern Area
HSE-S	HSE Southern Area
HSE-W	HSE Western Area
MRSA	Methicillin Resistant *Staphylococcus aureus*
MSM	Men who have sex with men
NVRL	National Virus Reference Laboratory
STIs	Sexually Transmitted Infections
TB	Tuberculosis

Health Protection Surveillance Centre

25-27 Middle Gardiner Street Dublin 1 Ireland
Tel +353 1 **876 5300** **Fax** +353 1 **856 1299**
Email hpsc@hse.ie www.hpsc.ie